The Builder.

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Decoration of the Central Hall, Houses of Parliament.

ABOUT a month since we made note of the recurrence of one of those little passages of arms on an artistic question which occur now and then in our legislative assembly, just to remind its members, apparently, that there is such a thing in the world as art. It is true that whenever such discussions are raised we hear that the House was very empty, and the discussions are usually carried on by two or three members who habitually profess an interest in art, and who are nearly certain to be heard if any such subject is raised. As a general rule, it may be added that the art-critics of the House are pessimists, and that they are usually in opposition to anything whatever that is proposed, not because they are indifferent, but because, according to their account, everything is so hopelessly bad in modern art that it is no use doing anything at all.

The particular discussion we refer to was raised (on the 16th of August) by Mr. Schreiber, in reference to the three panels in the Central Hall which are still left blank, wanting the pictorial designs, of some kind, which they were intended to receive. Mr. Schreiber called attention to the fact that the completion of the decorative scheme of the Central Hall had been left in abeyance for twelve years, except in regard to the one panel occupied by the mosaic reproduction of Mr. Poynter's fine design of St. George. Mr. Schreiber intimated that he did not intend to let the question alone, and before the House separated for the recess he wished to know whether the Government had any policy in regard to the Central Hall, and if so, what it was. Referring to the partial failure and great tendency to decay exhibited in some of the frescoes, he disclaimed any intention to ask for money for the completion of the decoration in that medium, which had led to so much disappointment. Besides, the decoration scheme might now be said to be "under the mosaic dispensation," one mosaic picture having already been executed. Mr. Schreiber said that having been absent from the House for twelve years he had been much disappointed to find after all that time the decoration of the Central Hall still unfinished; and he had asked the late Mr. Adam when it was intended to complete it, and whether he was in possession of the designs for the three vacant panels. The reply seems to have been, like the panels, a blank: all that was elicited was that there had been much discussion about the matter in 1870-71, but that no definite conclusions had been arrived at. Whether designs for the three panels had been made, or were in possession of the then Commissioner of Works, did not appear. Mr. Schreiber said he intended to press the point next Session, and if he did not then find that Mr. Poynter had been commissioned to prepare a design for "St. Patrick" he should appeal to the patriotic feelings of the Irish members in regard to the exclusion of their patron saint from the House. That it would be necessary to get up some such side-play on the subject to awaken any real interest in it, is, we fear, likely enough. Mr. Schreiber concluded for that occasion with a motion that the decoration of the Central Hall, interrupted twelve years ago, should be resumed and completed in mosaics.

So far Mr. Schreiber, on the occasion in question. It remains to consider what response was elicited by this well-meant proposition, and what, as far as our judgment goes, is the real truth of the matter. As far as any ostensible response was elicited at the time, it was almost entirely of a negative character, and was confined to some criticisms by Mr. Cavendish Bentinck, and the reply of the First Commissioner, Mr. Shaw Lefevre. The remarks of the former gentleman showed little thought or consideration, and were only too typical of the tone frequently taken by the few amateur art-critics who are numbered among our Parliamentary representatives. According to Mr. Bentinck, everything to be had was so bad that it was useless to do anything. All the frescoes in the House were failures, all the mosaics that had been executed in England were failures, including the mosaic picture of St. George, already executed. The remedy, according to Mr. Bentinck, was to do nothing. The mosaics in St. Paul's, by two of the greatest living artists, were total failures, and an awful warning against attempting anything of the kind. The most original reason, however, for Mr. Bentinck's let-alone policy was that the decoration of great national edifices had never been finished at once,—it had always been the work of many generations. The argument seems to be, therefore, no decoration that is worth anything can be accomplished unless it is allowed to drag out in a similar manner. It would be waste of time to bring counter-arguments against such logic as this.

The reply of the First Commissioner resolved itself into this,—that the existing mosaic had not given satisfaction; that the artist had, in fact, wished to have a portion of it cut out, in order to be better carried out *de novo* (this would seem to imply that the dissatisfaction was with the execution, not with the design); and that the committee of artists, called together by Mr. Ayrton (ominous name in connexion with such a subject), which included Messrs. Poynter, Pope, Herbert, and Armitage, had recommended that the remaining panels should be filled in with fresco. Having in view the generally unsatisfactory opinion about the existing frescoes in the House, he could not feel justified in asking for a vote for the fresco scheme. In regard to the mosaic scheme he considered it would be very undesirable to go into that, unless there were an assurance that the work executed would represent the highest art. The breaking up of the mosaic school at South Kensington had deprived them of one means of obtaining the execution of the work, and in the present unsatisfactory state of mosaic art, it would be better to leave the panels incomplete. Result,—motion negatived.

It is exceedingly unsatisfactory and annoying to find this sort of tone taken in Parliament on what seems a most reasonable proposition to make some endeavour to worthily complete the decoration of what is architecturally the finest portion of the House. Before considering the main subject, we may observe that we by no means admit the *dictum* of Mr. Bentinck that the mosaics in St. Paul's are entire failures, nor do we know very well why the public or the House should be expected to take his word for it. We have always held that the introduction of such colossal figures into the architecture of St. Paul's was a very questionable expedient, inevitably dwarfing the scale; but that is beside the question. As mosaics, the two figures by Mr. Watts and Mr. Stevens are certainly worth something better than to be dismissed so cavalierly. Now in regard to the existing mosaic in the Central Hall at Westminster, it is under two decided disadvantages inseparable from its position, or almost inseparable. In the first place, it is on a flat surface, whereas mosaic is always most effective on a more or less concave surface, which by its diverse reflections brings out the brilliancy of the material. Secondly, it is in the daytime under a shadow formed by the deep reveal and archivolt of the arch which makes the framework to the panel; and the light being subdued by stained glass and admitted rather high up in the walls, there is only a very moderate amount of direct light upon the picture, and a considerable shadow thrown downwards over it from the upper portion of the arch. Our last inspection of the work was on a very dull day, which made the defects of the position more remarkable than usual. On a bright day it would show much better; and under artificial light, in which it must be viewed for at least a large proportion of the period during which the building is fully occupied, there is certainly nothing to prevent this and all the other panels, if similarly filled, from being well seen.

The difficulty in the daytime, in regard to effect, lies partly in the fact that the windows are filled with tolerably strong-coloured glass,

It should have been recognised at first that strong effects in polychromy cannot well be carried out on walls and in windows in the same apartment. For a perfectly satisfactory effect, you must choose between coloured decoration by reflected light and coloured decoration by transmitted light; both cannot be equally effective in the same place. There must, in the case of wall decoration by reflected light, be sufficient light admitted through the windows to give brilliant reflections; and the want of this is the drawback in the Central Hall. But still, this defect is only seriously felt on dull days, and is not in itself sufficient to furnish a reason for letting the matter alone altogether, and leaving these dull blank places in the generally rich design of the Central Hall.

We urge strongly, therefore, that the panels ought to be completed, that the action of the Member who drew attention to it before the close of the session was very opportune, and that something more ought to be heard about it when Parliament meets again; and there can be no doubt that when carried out, the new designs ought to be carried out in mosaic, the same material in which the present panel is executed. In regard to this point, we read with astonishment the statement that four artists, called in by Mr. Ayrton to enlighten his mind on the subject, recommended that the remaining panels should be treated in fresco. Surely these gentlemen must have based their recommendation on a supposition that the panels would never be seen sufficiently to distinguish fresco from mosaic; otherwise it is inexplicable how they could have recommended the juxtaposition of two such very opposite methods in the same apartment of a building. The whole design of the Central Hall is absolutely symmetrical, and to place on one face of it a mosaic with its reflecting surfaces and rich colour, and on the other three faces frescoes with their dead surfaces and necessarily rather low colours, is such an absurdity that we can hardly believe that four artists recommended it, and can only say that if they did, their ideas as to the relation of pictorial decoration and architectural effect must have been very hazy.

As to the prevalent opinion, for such we believe it is, that the large number of existing frescoes in the House are failures, a word may be said here. That the frescoes gave much trouble in regard to material failure every one knows; and the difficulty was, perhaps, in itself sufficient to deter any one, from a mere commercial point of view, from voting money to pay for more work of the same type. In regard to artistic effect, the frescoes in the House are, however, also in great measure failures, owing to defective æsthetic or bad position, or both. The two great paintings by Maclise, in the Royal Gallery, whatever degree of success they may be considered to have as paintings, are completely wanting in reference to the architectural design. They are obviously colossal afterthoughts; they are either too long for the gallery or not long enough; they should have either run the whole length of the walls, or they should have been confined to a well-marked central space, which should have appeared to be naturally left for such decorative treatment by the arrangement of the architectural design. As it is, they only suggest that two immense paintings have been got into the room, which have no necessary relation to the architectural scheme of the interior, and which it is impossible for any one perfectly to see either in regard to distance or lighting, for the light is for this purpose nearly as bad as it can be, it being impossible to look up at either painting without the eye being annoyed by the window over it, while the two cross-lights mutually interfere with each other on each painting. The moral is that when it is intended to introduce important paintings on a large scale as a permanent decoration to an interior, the architecture and the lighting should be designed from the first in reference to the painting. The frescoes in the corridors are better off in one point; they are distinctly prepared for in the architectural design, and form an integral part of it, or, at least, its necessary complement. The panels are prepared for the reception of a series of designs, and they fall naturally into their place. But there, again, are some failures in effect, partly from the same cause as in the Royal Gallery, the cross-lighting; which, coupled with the glazing that it has been found necessary to put over them, renders it exceedingly difficult to see them at all. There is also a mistake inherent in at least a good many of these works, viz., that the treatment is too distinctly pictorial,* either for the capabilities of fresco or for the position of the paintings in relation to the architecture, and that a degree of realism is attempted in some of them which cannot be satisfactorily attained in fresco, and consequently impresses us with an idea that the artist has missed his aim, and that the execution is coarse and unsatisfactory. This would have been avoided if a flatter, more conventional, and less pictorial treatment had been adopted, as would certainly have been done had the work been commenced now; but at the time these frescoes were commenced the value, and even necessity, of a certain marked conventionalism in such a situation, and with such a method, was not understood as it is now. It must be admitted, however, that even then there would have been difficulty in meeting the natural demand for historical truth of costume in paintings intended as representations of facts in the history of England, while preserving the conventional style.

It is in this sense that we agree that the frescoes in the House are to a certain extent failures in regard to their main object as decorative art. The difficulty in regard to realism would not be felt in reference to the class of subjects with which the large panels in the Central Hall are proposed to be filled. So far as that goes, fresco would be a very suitable medium for such designs as the St. George of Mr. Poynter, and others in a similar style and spirit. The reasons against it are, first, that the other frescoes have shown such great tendency to rapid decay (a consideration which from a commercial point of view, we must expect would impress itself strongly on members of the House who have seen these works peeling off before their eyes); secondly, that the one panel is now execu'ed in mosaic, constituting a very fine design, to the merits of which the art-critics of the House seem remarkably blind; thirdly, that the very rich decoration of the vault and walls of the Central Hall requires mosaic as its highest point, and that the comparatively dull surface of fresco would be killed by the general effect of the apartment, and more especially by the stained glass. That the stained glass is an impediment to the effect even of the mosaic by stopping out too much light, we have already said; but as the glass is there and is not likely to be deliberately taken out again, there is no question that mosaic is the form of mural decoration which is best calculated to hold its own against the effect of stained glass windows, and that it is, in fact, the only form of wall decoration which it is worth while to introduce in the positions in question.

The objection that there is not English talent available at present to execute mosaic in a high style, if we are to admit the fact, certainly ought not to be taken as a reason for not proceeding with the work. We can at least go to English artists for the design, and if we cannot find in England the workmen, we must go elsewhere for them. Let it be observed, in conclusion, that the estimated cost of the three unfilled panels, reckoned on the basis of the already completed one, is only about 2,000*l.*; and it is surely not to be supposed that any large proportion of educated tax-payers would consider that an extravagant or unjustifiable outlay for completing the decoration of the central point of the national legislative building, even if circumstances preclude us from getting all the effect which we might wish to obtain. The incomplete state of the Central Hall is not creditable to us, either to our spirit and liberality in many matters, or to our artistic feeling; and though this latter element is, we fear, by no means well represented in the House (inasmuch as people are not elected to Parliament on account of their artistic culture), there must surely be a large section of the constituencies who would quite approve of going to some little expense in completing the decoration of a part of the House, in which, as it is a public place in time of session, they have as much direct interest as members themselves. We hope the point will be brought up again and satisfactorily settled next session. We have only recently recorded (see page 279, *ante*) the completion at Aix-la-Chapelle of an important work in mosaics, and the interest which the accomplishment of the work has excited in Germany. The state of our Central Hall at Westminster, and the apparent indifference of the Legislature about it, contrast ill with the account we then published.

* Some few of them, as will be remembered, are actually reproductions of oil-paintings, with very unsuccessful result when compared with the original paintings.

ELECTRICITY AND OUR FOOD SUPPLY.

THE most wonderful and important discovery yet made by man is, there can be no dispute, that of the mutual convertibility of the chemical, physical, and electric forces. We are not speaking of any single effort of imaginative genius, or of the mass of the contributions to science offered by any single pioneer of the army of discovery. Little by little the great truth has become clear. Little by little has the veil of Isis been raised, and the motto which is now being cut, in hieroglyphics more luminous than those which identify the mummies of Egyptian kings and conquerors, is in the terms, "TO MOVE IS TO BE."

In the later years of well-earned leisure enjoyed by George Stephenson, when the great engineer was devoting many hours to the task, long seeming impossible, but ultimately accomplished, of making cucumbers grow straight, no topic was ever more grateful to the inventor of the locomotive than that of the manner in which the provender for the iron horse had been stored up by the prehistoric agency of the sun. By encouraging that rich and copious vegetation which purified the atmosphere of our planet from a large amount of carbonic acid, or, at all events, of some volatile form of carbon, the sun was at work for millions of years in imprisoning in woody tissue that free energy which was accumulated, compressed, and stored in coal. The pick of the Northumbrian collier was the weapon by which that rich store of solar heat and light was rendered accessible to the toilers of the nineteenth century; and the stationary engines, of which Watt was the founder and first producer, no less than the locomotive engines perfected by Ericssen, Stephenson, Brunel, and their lieutenants, owed their life and play to the vegetation of the great carboniferous age.

Those of us who have seen with our own eyes the introduction and the improvement of the locomotive, are those who are most profoundly impressed with the immeasurable significance of the strides that have been made since that time in the study of dynamics. We do not so much refer to the development of mechanical improvement, as to the growth of the conception of the unity of force; for, great as mechanical progress has been in the last half-century, and increasing as is the daily rapidity of its development, it is evident that entirely new lines of advance are opened to the genius of man by the discovery of the master secret of mechanics. And the Faure battery, the efforts of Colonel Beaumont to utilise compressed air as a convenient motor,—indeed, the whole range of invention that deals with dynamo-electricity,—are but the first steps taken to reconnoitre and to survey this new province in the kingdom of Science.

It is impossible to give a more striking proof of the pregnant promise of the scientific discovery in question, than is afforded by the fact that one of the most brilliant of contemporary mechanists has been wiled away from the pursuit of mechanics to devote a portion of his time to the opening of a new chapter in horticulture, arboriculture, and agriculture. Let any one read the full text of the address of Dr. Siemens to the British Association, on electric energy, to which we have already referred, and we do not envy him if he fails to catch something of the noble enthusiasm of the speaker. We live fast in these days. Our views change with the change of circumstances. What was regarded as colossal eighty years ago is now only rather large. A millionnaire is not now a man who stands in the first rank of wealth. Thus for what may be needful to establish a scientific reputation of the first order we are becoming yearly more exorbitant. But we do not hesitate to say that if the results of a study of apparently some two years by Dr. Siemens could have been attained only a decade ago, they would have been regarded as an ample and most brilliant outcome of the labour of an entire lifetime of a scientific man.

On the 1st of March, 1880, Dr. Siemens communicated to the Royal Society a paper "On the Influence of Electric Light upon Vegetation." During the whole of last winter he has continued his experiments on the subject on a large scale. We must refer our readers to the address itself for details, but we are anxious to give some faint idea, in block, of what has been already ascertained. As for what may come of it in the future,—the prospect is too vast to take in at the first view. It almost seems as if that which has been the dream of

the lifetime of Liebig, the production of human food by the chemist, was about to be realised by the genius of the electrician. If we cannot yet directly combine inorganic elements into matter that can be assimilated by organised beings, it seems, at all events, likely that we shall be able immensely to stimulate the combining action of organic life itself.

The horticultural experiments of Dr. Siemens were directed to the end of ascertaining the effect of a powerful electric light on the growth of plants. They were carried on in a glass house of 2,318 cubic feet capacity, and in some sunk greenhouses, of which the capacity is not stated. The stimulating energy applied was luminiferous —not thermic,—and the heat desirable for the growth of the plants was obtained from the waste steam of the engine which drove the dynamo-motors of two electric lamps of about 5,000 candle-power each. The experiments were carried on for 197 days, from the 23rd of October, 1880, to the 7th of May, 1881. The nominal power of the steam-engine employed was 6-h.p. The consumption of coal was 56 lb. per hour, which makes a cost (at 20s. per ton) at 3d. per hour per light of 5,000 candles. This cost, however, has to be reduced by the value of the heat afforded by the spare steam, so that the net cost of the light in cases where water-power or even wind-power is available, would be infinitesimally small. To that part of the case, however, we may have hereafter to revert. The actual effect of the light is matter of incomparably more interest than its present cost in money.

Dr. Siemens planted in the glass house peas, French beans, wheat, barley, oats, cauliflowers, strawberries, raspberries, peaches, tomatoes, vines, and a variety of flowering-plants. He maintained an even temperature of about 60° Fahr. His first experiments were unsuccessful, the tender leaves of the plants being, as it were, scorched by the fierce artificial light. Not baffled by a check which might have discouraged any but a born inventor, Dr. Siemens proceeded to make experiments on the virtue of different hues of light, by transmitting it through variously-coloured, as well as through clear, glass. To his infinite delight, we should conceive, he found that a screen of clear glass was all that was required. Whether the products of combustion in the electric arc affected the plants injuriously or not does not seem quite certain, but that radiating influence was the main agent the careful and ingenious experiments have left no doubt. That there are invisible actinic rays at the most refrangible end of the spectrum which are poisonous to plants, and that these rays are arrested or transformed by passing through clear glass, may thus be stated as the first positive discovery wrought out from the experiments. And as to the colours of light, the order of merit is,—white light, transmitted through clear glass, yellow, red, and blue. A vigorous growth was attained by the plants lighted through the first. They became feeble and more imperfect, in the order given, until those exposed to the unguarded light showed a stunted growth, and a very dark and partly shrivelled leaf.

The electric light was kept on from five p.m. to six a.m. every night except Sundays during the whole experiment. Strawberries ripened under it on the 14th of February, pears on the 16th of February, raspberries by the 11th of March, and vines bore ripe grapes on the 10th of March. The size, beauty, and flavour of the fruits are described as unusually good. A banana, set within two yards of one of the glass-protected lights, bore a bunch weighing 75 lb., each banana in the bunch being of unusual size, and the flavour being declared to be unsurpassed. Melons, remarkable for size and aromatic flavour, were also produced in the early spring. We are not reciting a fairy tale. Dr. Siemens has already given hostages to science enough to justify the public writer in accepting with implicit faith the precise statements of a report bearing his signature.

Subject to that reserve with which the results of any wholly new power must always be in the first instance received, it really seems as if the problem of artificial horticulture had been definitely solved by Dr. Siemens. And as to cost, it is positively ludicrous to speak of it. For there seems small reason to doubt that, at all events with annual vegetables, the crops of three or four years may be certainly raised, by the aid of the electric light, from soil that now, under the most favourable circumstances, can only give an average yearly harvest. And if we take one maximum harvest out of three years, the increased value of the soil to the cultivator is octupled or decupled. These seem large figures, but they are the simple outcome of the data before us.

The next thing that strikes our attention from these experiments is, that the sleep of plants is an accident of the constitution of our globe, and that, though innocuous, and consistent with all that goes on in our alternation of day and night, it is not a necessity of their nature. The entire absence in plants of a nervous system at all comparable to that of the members of the animal kingdom, is an argument that such nocturnal rest is unnecessary. Indeed, it seems from the experiments that a nightly growth does actually take place, but a growth of stem and leaf, at the expense of flower and fruit. How far the winter rest may be necessary, we do not think that the experiments as yet illustrate. We have, therefore, spoken of annual plants alone.

As to the cereals, which, of course, form the great *point-de-mire*, the experiments have as yet been unsuccessful. We venture to think, however, that the failure is due rather to a want of knowledge of the exact conditions favourable to the growth and ripening of wheat, barley, and oats, than to the failure of the electric light to anticipate the rays of the sun. A low temperature at certain stages of their development is probably a necessity for the healthy growth of these plants. In the Apulian plains, where the finest wheat we have ever seen is grown, frost, though not severe, is not unknown, and cold winds from the snow-capped Apennines are frequent. The great thing for the growth of the cereals is the timely sequence of cold and heat, of moisture and of drought. The cases are rare when these are supplied in their exactly required order and proportion by nature; hence the rarity of the best harvests, and the frequency of poor ones. But let the annual biography or rather phytography, of the corn-plant be once known, let the proper hygrometric, calorific, and luminiferous conditions for each succeeding stage of its growth be once fully ascertained, and we see no reason why corn should not be forced by electricity, aided in due time by icy or by sultry blasts, with perfect and certain success.

Dr. Siemens concluded his most valuable paper by suggestions as to the application of electricity to perform the hard work of a farm, to plough, to thrash, to pump. Into that we cannot now follow him. Not that these applications of the electric force are less interesting, but that the idea of the dynamic husbandry is more so. The field is so new, as well as so vast. And the interest which the invention should command is intensified at this moment by the condition of British agriculture. The harvest that was to make up for a series of bad years seems to be eluding the farmer daily. Only 8,875,702 acres of land in Great Britain were under corn crops in 1880, as compared with 9,675,261 acres in 1871. In Ireland there were 1,766,424 acres under corn in 1880, 2,124,079 in 1871. Potatoes show a like decline. And all green crops, including potatoes, in Ireland, sank from an acreage of 1,511,532 acres in 1871, to 1,247,359 acres in 1880. In Great Britain the green crops covered 3,738,180 acres in 1871; 3,476,653 in 1880. The crops have fallen off in a far more rapid proportion, the monthly sales returned by the Board of Trade having amounted to 12,731,751*l.* in 1871, and only to 6,381,684*l.* in 1880. We do not wish to travel outside the proper limits of these columns. But facts are not opinions, and when, on the one hand, we take such ugly and menacing facts from the statistical abstract of the United Kingdom, and, on the other hand, mark the result of experiments that promise to make two, if not three or four, ears of corn ripen with certitude where now one ripens with hazard,—we think we are justified in calling attention to the paper of Dr. Siemens on about the most interesting subject as to which any Englishman can allow his imagination to indulge its reveries.

The Birmingham and Midland Institute.—The new wing of the Birmingham and Midland Institute, which has been necessitated by the great increase of students both in the industrial and general departments, is now approaching completion, and will be formally opened on the 20th of October, when Dr. Siemens, the president, will deliver the inaugural address in the Town-hall. The total cost of the new block is about 30,000*l.*

THE NEW ALEXANDRA DOCK AT LIVERPOOL.

AN occasion not unworthy of the presence and sanction of their Royal Highnesses the Prince and Princess of Wales was the opening, on the 8th current, of new dock accommodation, amounting to 110 acres of water-space, and more than 6½ miles of quay-berthing, in Liverpool. For the description of the spectacle and of the festivities our readers must turn to the local papers; for Liverpool has her own daily as well as weekly press, and is not content with a corner in the London morning newspapers. But we cannot pass over either the great engineering features of the extended accommodation given to the traffic of the Mersey, or the brief but exhaustive summary of the progress of the commerce of Liverpool, which was given by the Prince of Wales in returning thanks for the toast to his health at the luncheon spread in one of the sheds of the new docks on the occasion.

At the commencement of the present century, said his Royal Highness, dues were paid in Liverpool on 650,000 tons of shipping; at the present time they are paid on between 7,800,000 and 7,900,000 tons, an increase of twelve-fold. In 1846, when his Royal Highness the Prince Consort visited the town, and opened the Albert Dock (called after his name), the docks for the business of the port of Liverpool were twenty-seven in number; they are now fifty-eight. In 1846 the area of water in the docks was 122 acres; it is now 543. In the former year the length of quayage was 9½ miles; it is now 40 miles. In 1846 the extent of the dock estate was 506 acres; it now amounts to 1,545 acres.

To these important figures thus put on record from the lips of the Prince of Wales, it may be well to add some details which will allow of comparison between the growth of Liverpool, as a port, and that of the general commerce of the United Kingdom. In the year 1800 (taking a proportion of a decennial return), the total tonnage of vessels employed in the foreign trade cleared outwards to all parts of the world, including Ireland, from the ports of Great Britain, was 175,000 tons. In 1846 the total tonnage of British and foreign vessels cleared from the ports of the United Kingdom was 6,314,571 tons. In 1880 the corresponding tonnage was 18,903,530 tons. Subject to any slight correction as to the value of Irish commerce, the advance of our mercantile activity, as measured by the tonnage of vessels clearing from our ports, has been thirty-sixfold between 1800 and 1846, and threefold between 1846 and 1880. As to the growth of Liverpool during the first period, it was prodigious, for it was starting almost from nothing. During the second period, in which our general commerce was multiplied by three, the number of docks in Liverpool has more than doubled (multiplied by 2·15); the area of water-surface has more than quadrupled (or multiplied by 4·45); the length of quay-walls has also quadrupled; and that powerful and important body, the Commissioners of the docks, have rather more than trebled the area of the extent of their property. Certainly Liverpool has kept well to the fore in providing for the increase of our commerce.

In 1873 the development of the steam navigation of the port of Liverpool was such as to call for more accommodation than then existed. Plans were prepared by Mr. Lyster, the engineer to the docks, and Parliamentary powers were obtained to borrow 4,100,000*l.* on security of the dock rates, with which capital the new works were paid for as they proceeded. The entrances of the new docks, containing, as before stated, 110 acres of water, had their sills laid at a level which allows the general class of vessels frequenting the Mersey to enter at any state of the tide. The docks are situated at Bootle, 3½ miles seaward of the Royal Exchange of Liverpool. The principal entrance is through the Canada basin, a sort of *avant-port* to the most northern docks, in which the tide ebbs and flows freely. This basin itself has been considerably enlarged and deepened to meet the new requirements, and its entrance from the river has been increased from 380 ft. to 400 ft. in width. Timber jetties are now in course of construction on each side of this entrance, projecting into the river. That on the north side, which is complete, is a remarkable work, called the Horn pier. The river wall curves sharply outwards, and terminates in a massive iron-clad bastion or pier-head of granite. From this the jetty returns for about 40 ft., ending in another pier-head of concrete, from which an

arm is thrown out to the new wall. On the north end of the Horn pier is a look-out tower, and an iron standard 80 ft. high, for the display of the electric light. The jetty is supported by strong uprights of green-heart timber, let into a granite base. The form of the wall is intended to break the force of the waves which rush up the Mersey in stormy weather.

There are two passages from the Canada basin, giving entrance to the new docks. The first of these is the Langton Dock, with a water-area of 18 acres, and 4,000 ft. run of quay or berthing space. On the eastern side of these docks are two graving-docks, each of which can be so divided as to accommodate two vessels of large size. Pumping-machinery for emptying the graving-docks is erected on the quays between them, as well as hydraulic machines for opening and closing the dock-gates, bridges, and sluices, and for working the cranes. The pumping-engines, in two sets, of 420 horse-power, are by Messrs. Hull & Son, of Bolton. The hydraulic machinery is worked by a 350 horse-power engine, by Sir W. G. Armstrong & Co. Rooms to accommodate the foreman and enginemen are arranged in flats over the engine-house; and there is a clock-tower 120 ft. high, which contains the accumulators.

On the east side of the Langton Dock is a branch dock, with three acres of water area, and 2,000 ft. of quay. On the south quay of this dock will be an hydraulic 100-ton crane. On the north side of the Langton Dock two passages lead into the Alexandra Dock, named after Her Royal Highness the Princess of Wales, who opened the same on the 8th current. The Alexandra Dock has been expressly designed for the accommodation of steamers of the largest size. It is 1,600 ft. long from north to south, and on its eastern side are three branch docks, ranging from 1,100 ft. to 1,338 ft. in length, which extend inland to the main thoroughfares of the Regent-road. Altogether, the water area of the Alexandra Dock and its branches is forty-four acres, with nearly 12,000 lineal feet of berthing for ships.

The walls of the docks are built of cement concrete, faced with red sandstone of the neighbourhood, and coped with granite. The entrance walls are faced with granite. The steps and slips of the graving-docks are faced with granite. The dock-gates are made of greenheart timber; a wood of great specific gravity, and considered to be extremely durable. The berthing quays are provided with storehouses, from 80 ft. to 95 ft. wide, for the protection of cargo in transit; and there is direct communication by rail from these sheds to the termini of the several railways, as well as by road to the city itself.

For those who care for omens, it may be added that a fine carving of the Royal Arms of Great Britain before the union with Ireland has been lately discovered in the King's tobacco warehouses, near the docks, having been removed from an old building on the Dock estate. The stone has been re-erected as a memorial of the visit of their Royal Highnesses, and a floral border has been cut to surround the escutcheon, in which the shamrock has been inserted, and by which the plumes of the Prince of Wales are conspicuous. On a granite slab is cut the inscription, "These Arms of Great Britain, in the reign of George III., were removed from an old building on the Dock estate, and are erected here as a memorial of the auspicious visit of their Royal Highnesses the Prince and Princess of Wales on the occasion of the opening of these docks, September 8, 1881."

The presentation of a silver trowel on the occasion of laying a first stone has been long justified by the convenient service afterwards to be rendered by that implement as a fish-slice. The Liverpool Dock Commissioners seem to have drawn practical wisdom from their study of the Arabian Nights Entertainment, or some other fairy tales; for the handle of the lever by which the Prince of Wales set in motion the machinery for opening the great sea gates of the docks, turned, after its function was accomplished, into a hunting-knife, which was presented to the Prince; and the gold and jewelled knife with which Her Royal Highness severed the silken cord to allow of the opening of the Alexandra Dock, was, screwed into the handle of a parasol, presented to the Princess as a souvenir of the occasion.

The Eastbourne Sanitary Exhibition, we learn, has been successful even in a financial point of view. The expenses were 425*l*., and there is a surplus of 40*l*. to the good.

FROM GERMANY.

Artistic Progress.—Professor Mohr, of Cologne, has lately exhibited in the museum of that city a gilded drinking-vessel designed by him, and executed in cast silver by H. Gladenbeck, of Berlin. The *Kölnische Zeitung* remarks that of late years there has been a general want of independent artistic invention, with regard to ornamental art, and notably as to vessels and ornaments of gold and silver. The writer of the article remarks that the goldsmiths of modern times seem to have lost that appreciation of the finer technicalities of their art, which was possessed by the workers of the sixteenth century, and calls attention to the numerous opportunities modern times afford artificers in precious metals for displaying their inventive genius, as to the forms which their productions should assume. These opportunities, it is urged, are neglected by the goldsmiths and silversmiths of the present day, who usually confine themselves to executing designs furnished to them by artists not members of their craft. The modern system of division of labour seems also, it is said, to be unfavourable to that unity of design so essential to good effect, and which is the secret of the renown achieved by such masters of their art as Benvenuto Cellini.

Professor Mohr has been occupied four years on this work, having met with many interruptions. Besides numerous ornaments and masked heads, there are fifty-six figures produced by casting and chiselling. The length of the part which contains the figures is 24 in. On one side the pleasures and griefs of love are shown, and on the other the different effects of wine: the former is quite a romance. A cavalier is serenading his lady love, and on the appearance of a jealous rival a duel ensues, in which the lover is victorious, and the final subject represents the happy pair on their way to the hymeneal altar. The surrounding foliage contains allegorical and other objects in harmony with the jewelled work displayed. The other side portrays a young vine-dresser in a vineyard, and the vessel of wine lying near is supposed to have brought before him a fantastic vision. In the following picture he has become a cellar-master, and in harmony with the previous revelations as to his bibulous disposition, he is seen carousing in company with a soldier and a student. The succeeding group contains a moral, as the Evil One is seen rising in a sheet of flame from a cask of wine and looking for a victim. Numerous other figures of a subsidiary nature are included in these well-executed groupings. The central point of the vessel is formed by a wreathed head of Silenus, with the motto *Ad multos annos* (For many years).

The lid is in harmony with the minor ornamentation of the body, and represents Tritons, Naïads, and dolphins in their native element. The handles are in a similar style. The upper part of the lid consists of an allegorical figure, on which the arms of Cologne are introduced. The lower part of the vessel rests on richly-executed figures as bearers.

The Preparation of Estimates.—One of the technical organs of the glass trade in Germany recently called attention to the above subject, with special reference to a resolution adopted early this year by the Glass Corporation of Dresden. The following was the resolution in question:—"In consequence of the numerous demands for estimates of an extensive character, some of which referred to cases in which the execution of the work had already been practically arranged for, it is resolved that, in cases where estimates are not followed by orders, an amount will be charged in proportion with the trouble incurred." In commenting on the advisability of this step, the article points out that those who have contracts to give out are often very thoughtless as to the great amount of pains taken by each person sending in an estimate. It is suggested that ½ to ¼ per cent. on amount of estimate would be a fair charge in such cases.

The death is announced of Herr Moller, one of the leading members of the Berlin Architects' Association. Prior to the year 1868 he had held many important appointments under Government. In that year he was named director of the Royal Porcelain Factory. This post enabled him to display his architectural talent in the reconstruction of the building, and in the many improvements which followed. He was, apart from his professional career, a lover of art. His death (at the age of fifty-five) is all the more lamented by his friends from the fact of his having arranged to retire at the end of this year to enjoy a well-earned repose.

On August 28th the foundation-stone of an allegorical monument to the Knight of the Swan was laid at Cleves. A procession of historical personages took place, and the proceedings terminated with a ball.

The works at the Exhibition building, Hamburg, seem to have been unfortunate in the number of fatal accidents which have occurred there. A workman was killed a few days ago by falling from a height, this being the fifth death which has taken place from casualty during the construction. There are also at present five bad cases of injury in the hospital from the same quarter.

The Imperial Building Commission in Berlin has raised the question whether petroleum should not be used in place of gas, for lighting the grounds which it is intended to lay out behind the university, and also for that portion of the Kastanienwäldchen (or chestnut wood), in which it is proposed to make improvements. Some fears had been expressed that gas would have an injurious effect on the trees. The municipal authorities are in favour of gas being used, due precautions being taken to prevent the pipes from leaking.

The Minister of Public Works at Berlin has addressed an energetic circular to the railway companies under his control, pointing out the necessity of making every possible arrangements before the arrival of trains at intermediate stations, in order to save delays and to insure punctuality in their arrival at terminal points. Junctions are very numerous in many parts of Germany, and hence punctuality is doubly necessary for the convenience of the travelling public. In cases of necessity, particularly when the last train at night has been lost at a junction, the forwarding of passengers to some convenient point by special train is recommended.

ABATTOIRS FOR ST. PETERSBURG.

THE new slaughterhouse for St. Petersburg, designed by the architect Kitner, will, it is expected, be opened for use next November. The main structure is already finished. The façade, situate in the Zabalkansky Prospect, is 129 sashen (301 yards) in length, and the area covered by the whole erection is 20,382 square sashen (110,968 square yards).

In the front plan are five blocks of buildings, of which one will be occupied by shambles or stalls for the sale of entire carcasses, and which will be leased to tradesmen. The remaining blocks will be taken up with the offices, the dwellings of the attendants, the inspector, and two veterinary surgeons, &c. This row of blocks is separated by a moderate-sized court-yard from the abattoirs themselves, which are situate in the back plan, and disposed in rows, with numerous passages for the entrance of cattle. The abattoir for large horned cattle consists of thirty-six separate compartments, each capable of holding twenty oxen. In each of these compartments a small space for the operation of slaughter is railed off with zinc-covered iron. Here there is placed a movable *cadette*, or platform, upon which the animal falls as it is killed, and which then carries the carcass out of the railed space and into the first compartment. Here it is lifted up by means of a special appliance, called a *tigalet*, and disembowelled, and then by a hook and pulley it is raised and suspended upon a movable circle of sufficient dimensions to hold twenty carcasses at a time. This circle, revolving upon circular rails, which depend from the ceiling, bears the carcass to the doors of the abattoir, where it is lowered upon a car. It should be added that the oxen awaiting slaughter are so placed that they are unable to see the operation of killing or the blood. It is proposed to collect the fresh blood as it flows away, in order to extract albumen from it, the right to do so being farmed out. We may mention here that the hot blood is much utilised at the Paris abattoir as baths for weaklings and sufferers from rachitis, &c.; while other invalids take it internally, and, it is said, with great benefit.

The abattoir for calves consists of ten numbers for holding thirty head each, and the scalding oens for swine five numbers, each for 100 head. On the right of the abattoir are constructed reserve sheds for holding about 320 head of oxen, while on the left, and separate from the rest of the edifice, is a shed comprising two pens to hold each twenty head of oxen. These are for diseased animals, which are to be killed and

burned. Here also the examination of any suspected droves is made by the veterinary officers attached to the establishment. All the offal from the abattoirs will flow into a large reservoir of peculiar construction, situated in the farther part of the ground-plan of the building, in the "machine section." From this reservoir the offal is withdrawn by a pumping apparatus, is strained through filters, and thence passes on direct to the sea through tubes laid down for this purpose for a length of 6 versts (3·978 miles). Both the reservoir and the tubes are made of Schmidt's Riga cement. It is proposed to cover the lower portion of the interior walls of the slaughter-house with slate; the substance of the inner walls themselves is the *béton* prepared by Devars, of Moscow. The total cost will be over 70,000*l*.

CONTINENTAL GATHERINGS.

SEVERAL exhibitions are now "in full blast," and in their respective countries appear to meet with satisfactory success. The Electrical Exhibition in Paris has proved completely successful, and its results will unquestionably do much to further the aims which it was the intention of its promoters to encourage. The English press has already supplied to our public much valuable information regarding the exhibition.

Of the Italian Exhibition, held at Milan, scarcely a word is, however, heard on this side of the Alps, notwithstanding its brilliant success, —a success which is encouraging after the Fine-Art Exhibition so recently held at Turin. It is rather, we learn, from an industrial than from an artistic point of view that it has proved a surprise to the Italians,—a surprise from the fact of the activity shown in Italy of branches of industry believed alone to exist and capable of development in other countries. From this point of view a sensible progress has been marked by the Milan Exhibition. The Italian Chambers have instituted an official inquiry on the Exhibition, and from its reports some interesting information is to be gathered. Italy, whose industrial activity has till now been considered, not alone by the world at large but by itself, to bear chiefly on artistic productions, in which old traditions, taste, and æsthetic sentiment have had more to do than the practical,—industries such as that of the silk-weaver, the glass-blower, the mosaic worker, the furniture producer, the wood-inlayer, and such like,—now has shown an ability to compete successfully in the manufacture of those more mechanical contrivances and aids to industry for which, till recently, they had to rely on foreign countries, and chiefly, let it be remarked, on England,—agricultural and other machines, carriage-building, iron and other metal founding,—while a rumour reaches us of a revival of the lost traditions of the brilliant industry of the bronze-caster. Young Italy, and especially Northern Italy,—more distinct in its character from Central, and certainly from Southern, Italy, than even the South and North of America,—is growing apace, and among the nations of Europe is rapidly obtaining its place; but happily for the romancist, the sentimentalist, and the artist, it will be long before the new spirit will be able entirely to drive out from the old peninsula the cherished memory of its Classic traditions.

Of other exhibitions at present being held on the Continent, that now opened at Lille is deserving notice. Devoted particularly to the fine arts, and international in its character, it certainly will not be from want of attractiveness if it do not prove successful. A selection of pictures from the Paris *Salon* forms not the least feature, while England, Belgium, and Germany have all largely contributed, and we learn from a French authority the English section has been particularly noticed as "remarkable." Opened on the 29th ult., by M. Turquet, the French Under-Secretary for the Fine Arts, the Lille Exhibition will not close till the end of October. A visit to the industrious Franco-Flemish town on the frontiers of France and Belgium will well repay the traveller, and a reference to the ever-handy pages of Murray will amply post him up in the curiosities of the town whence came the Lisle thread and the cotton yarn that has so long competed formidably with our English manufactures. For the artist, be he painter, architect, or sculptor, let not special attention be neglected to the more than interesting Wicar Museum, with its priceless artistic treasures, gathered together by an enthusiast in the days when knowledge enabled the collector in his visits to Italy and the Continent to constantly come upon rare and genuine "finds." Among the numerous works of the great masters of the sixteenth century, possessed by the rich collections of Lille, is a treasure particularly interesting to the architectural visitor. A book of sketches, by Michelangelo, containing more than 150 designs, studies from the works of Brunelleschi, Bramante, and architecture of the fourteenth, fifteenth, and sixteenth centuries, and from various Classic works, original compositions, &c. The catalogue of the Wicar Museum, and the tale it tells of the industrious and benevolent old collector, is alone worth the visit to Lille, apart from the pleasant and instructive recollections that every traveller cannot fail to bear away with him from the old town.

Under the somewhat alarming and sensational heading of "Vandalism," our Paris contemporary *L'Art* has, we see, opened for some time past a special column in its pages to note the acts of injury wreaked on those monuments and works of art which it is the duty of all art-lovers to protect. Under this rubric has recently appeared, — alongside of an attack on the "Vandalism" of painting, cockroach colour, we suppose it would by some be called, the façade of St. Philip in Regent-street,—a sad tale of the threatened destruction of one of the old bridges of Venice, the Ponte Panada on the Fondamenta Nuova, to be replaced by an *iron bridge*, the construction of which will, we learn, cost considerably more than 500*l*., a sum which certainly would be more than ample to solidly repair the old structure, one of those characteristic canal bridges which every visitor to Venice will remember, and said by competent authorities to be the last of its kind left in the city. The proposal has met with violent opposition on the part of a number of persons, but to no avail; the Commission which exists in Venice for the preservation of the public monuments of the city has in vain been appealed to by the *Circolo Artistico*. We should have imagined that so soon after the recent agitation against the threatened restoration of St. Mark's, such an incident as this would not have occurred. Happily the new structure will not resemble in importance the "ghastly iron bridge," as Mr. Ruskin has fitly termed it, which crosses the Grand Canal "at its noblest bend," and its hideousness will, to some extent, be hidden from the eyes of the stranger, who must be venturesome indeed who ever pushes his way so far from the neighbourhood of St. Mark's as the Fondamenta Nuova.

The new Post-office in Paris is, from all accounts, progressing with great rapidity. The *Événement* has recently published some interesting details concerning the erection of the Hôtel des Postes. On the side of the new Rue Étienne Marcel the building has reached the first story. The façade on this side is 140 mètres in length, divided into seventeen large bays, and flanked by pavilions; the façade on the Rue de Louvre has only nine bays. In erecting the immense structure much of the work is brought to the spot ready prepared, and placed in its final position by means of steam cranes. On the side of the Rue de Louvre the cellarage will shortly be completed; all the masonry is, in fact, terminated, the iron girders and joists on which the ground floor will rest remain alone now to be posed. In that portion of the new building on the Rue Étienne Marcel, the works are not in so forward a state, and on the Rue Jean Jacques Rousseau side the masonry has not yet been even commenced. However, by the end of October, it is confidently expected that the whole of the foundations will be above ground. As might be imagined, the value of land in the neighbourhood has singularly augmented; some plots selling for hard upon 120*l*. the square yard, others at a mean of some 1,900 francs (76*l*.); one plot, some 60 square yards in area, going at 204,000 francs, or about 135*l*. the square yard.

FULHAM INFIRMARY COMPETITION.

IN this competition twenty-six designs have been sent in at estimates ranging from 20,000*l*. to 66,000*l*. At the first view of the drawings, on Tuesday last, by the Guardians, it was proposed and carried that a letter should be written to the President of the Institute of Architects, requesting him to name three architects,—Fellows of the Institute,—from whom the Guardians might select one to advise them.

APPROPRIATION OF WAGES AND OTHER SOURCES OF INCOME.

To Section F. (Economic Science and Statistics) of the British Association Meeting in York, Professor Leone Levi read a draft report drawn up by himself, and submitted to the committee, consisting of Professor Leone Levi, Mr. Stephen Bourne, Mr. Brittain, Dr. Hancock, Professor Jevons, and Mr. F. P. Fellows, for the purpose of inquiring into and reporting on the present appropriation of wages, and other sources of income, and considering how far it is consonant with the economic progress of the people of the United Kingdom. If it were possible, stated the report, to ascertain with any approach to accuracy the present appropriation of wages and other income of the people of the United Kingdom, it would certainly be of the greatest utility, as it would afford a valuable aid in the consideration of some of those great problems which meet us on every side in our social economy. There are, in truth, no means for ascertaining either the absolute income or the true expenditure of the entire population, and any calculation of the same must, more or less, partake of the nature of an estimate. It is the beauty and glory of what is termed the statistical method that it enables us to calculate the seemingly incalculable. With this instrument at hand, and with a good grip of the teaching of common experience, that which appears but a dream or guess to the uninitiated, becomes to the mathematician and statistician a simple, natural, and reliable result. Many attempts have been made to estimate the total income of the nation of late years. Mr. Gladstone, in one of his addresses, estimated it at 1,000,000,000*l*. The late Mr. Dudley Baxter, in his work on National Income, gave it at 813,000,000*l*. The writer made an estimate of the wages and earnings of the working classes in money or its equivalent, and found them to amount to 418,000,000*l*., and Mr. Giffen, in a paper read before the Statistical Society, estimated the recent accumulations of capital in the United Kingdom at the rate of 240,000,000*l*. per annum. After referring to the personal expenditure and the national expenditure for food and drink, dress, house, coal, gas, water, tobacco, education, literature, science and art, newspapers, church, theatres and music halls, other amusements, taxes, cost of distribution, as 878,000,000*l*. and 684,700,000*l*., he said these two sums give an average expenditure per day per head of 16·63d. as the personal, and 12·71d. as the real or national expenditure, or 25*l*. per annum in the one case, and 19*l*. in the other. Comparing these amounts with the personal and national income the results are as follow: — Income, 915,000,000*l*.; expenditure, 685,000,000*l*.; excess, 230,000,000*l*. The expenditure of the people might be classified into expenditure abroad and expenditure at home, expenditure in materials and expenditure in wages. Without attempting any further analysis, and having regard to the facts above stated, in connexion especially with what has been recently brought out by the census, of a continuously increasing population,—the effect of an increasing birth-rate and a decreasing death-rate,—we may conclude that the present appropriation of wages and other income cannot be said to be opposed to the economic progress of the people of the United Kingdom. A minute examination of the different items of expenditure is, indeed, calculated to remove the impression of any great extravagance on the part of the people as a whole. A large expenditure in bread, meat, woollen goods, and house-rent is a most economical expenditure. An expenditure of 124,000,000*l*. on alcoholic drinks is certainly very large, but reduced to the real expenditure the sum total is 42,000,000*l*. There is one element, however, which does not appear from this calculation, which might prove most unsatisfactory if properly inquired into, and it is that the averages arrived at are, in many cases, the mean of two extremes,—the extreme of waste and the extreme of penury; for side by side with those living in luxury and having no thought of waste, there are large numbers whose conditions of nourishment, state of dwelling-houses and clothing are of the lowest character. Nothing is gained by exaggerated statements of the national loss arising from the wasteful consumption of this or that article, or by taking as a national loss that which is in effect nothing more than the transfer of money from one to another; but a proper regard to the right expenditure of money is of the highest importance

to the individual and to the nation, for waste and profligacy are the parents of pauperism, demoralisation, and declension. And no greater service can be rendered by the economist or philanthropist than by exhibiting the duty and importance of husbanding aright our resources, and making them conducive to the economic progress of the nation. The committee is fully aware that some of the deductions and reasonings in this report are not founded upon well-ascertained facts, nevertheless it deemed it useful to present them as materials for consideration, and as helps to the elucidation of a subject of the highest social and economic importance. The report points out many wants and desiderata, and the committee recommends the reappointment of a committee, consisting of a larger number of members, for the purpose of suggesting means for supplying the same on a uniform and scientific basis.

SUGGESTED REMEDIES FOR WAGES DISPUTES.

THE Rev. W. H. Jemison, LL.B., Vicar of Stillington, York, read the following paper before the Economic Science and Statistics Section of the British Association on "Remedies proposed for Wages Disputes":—The prevalence of disputes about wages, and the serious character of their consequences, have naturally made thoughtful persons anxious in pursuit of remedies whereby these disputes may be composed or prevented. A few of the best known and most effective of the remedies proposed are here considered. The first to be mentioned is the plan of arbitration, on which employers and workpeople refer the matter in dispute to one or more persons in whose judgment and impartiality they have confidence. Taking such a step is wise, and often productive of good results, but arbitration is at best a rough expedient. The value of labour, as of other things, cannot be correctly determined prior to experience, it being the actual result of several agencies. The arbitrator's decision is, in fact, only an approximation to the exact truth, which, in the absence of something better, it is prudent to accept. Again, the plan is strictly applicable only within certain limits. It may reasonably be declined where the parties are under no need or obligation with regard to each other, or where the principle of an engagement and all the facts of the case are already known. Neither employers nor employed are to be held bound to leave it to an umpire to say whether or not they are to agree to terms, which, in their opinion, would expose them to uncalled-for loss, nor whether stipulations of undoubted right are to be carried into effect. The former is a matter for free choice, and the latter for legal compulsion. These exceptions, however, leave a large mass of cases in which reference to an arbitrator is most natural and reasonable, and in every way better than continuing a dispute. In such cases the reference should be prompt, in order that the work of production may not be checked, and the work of loss begin. Even though the rate of wage arrived at by the arbitrator may not be the perfectly correct one, and his decision be rather a cutting of the knot than an untying of it, it is far wiser for the parties to agree to abide by such decision than to keep the dispute open. It is better to refer to arbitration even more cases than strictly belong to it than incur the likely consequences of dissension. Important as it is to settle disputes which have arisen, it is still more so to prevent their occurring. Boards of conciliation, which have been formed for this purpose, are really arbitration under a more settled form. These boards, which have been established in some trades, and have for a long time existed in France, consist of an equal number of representatives of employers and employed, who discuss among themselves the circumstances of the trade, and decide on what is best for the interests of the parties. Such boards are well calculated to promote a good understanding, and the maintenance of peace and industry. No doubt, in their operation, there is something like cutting the knot instead of nicely and perfectly untying it, but there seems no reason why the plan should not work with the best results. It only needs that the representatives on both sides be wisely chosen; that they deliberate with calmness and moderation; and that their decisions and counsels be loyally accepted by those for whom they act. It is sometimes found desirable for these boards to agree upon a sliding scale, according to which wages rise or fall with the selling price of the goods produced and the circumstances of the trade. The adoption of such an expedient diminishes the appearance of anything of a merely arbitrary or fitful character in the action of the boards, and makes wages become in a manner self-regulating. There must, however, be a proper rate of wage fixed on to start from, and a proper price of goods taken as the standard, and all the necessary conditions made clear. Though, even so, the best adjusted scale will occasionally need to be revised and recast. In these Boards of Conciliation, fairly and efficiently carried out, we have a valuable method of diminishing the number and acerbity of disputes about wages. Another method proposed for the prevention of these disputes is the adoption of the system of co-operation. This method attracts considerable attention, and has much to recommend it. It is claimed in its behalf, that though not really at work for much more than twenty years, it has already something like one-twentieth of the population associated on its principles. Under this system an attempt is made, not so much to adjust as to extinguish the opposing claims of employers and employed, by getting rid of the distinction between these two classes. To use the recent words of a noble expounder (Lord Derby) of the system, "It is like the settlement of an old family law-suit by the marriage of the litigants." A number of workpeople put their savings together or borrow capital; they procure the buildings, machinery, and materials necessary for carrying on a business; and they work together, each doing what he seems best fitted for and receiving wages for what he does. The co-operators are thus wholly or in part their own labourers and their own employers; and at certain periods they divide amongst themselves as gain the whole or part of whatever remains over after defraying necessary expenses. A distribution of results thus takes the place of a partition between wages and profit. By such means, it is claimed by the advocates of this co-operation movement, the occasion of the disputes so common under the old system is necessarily removed. It is hoped, too, that a higher tone may be introduced by it into business relations: work and labour rendered more honest through the general interest of all parties in the result; and indebtedness discouraged through the practice of dealing for ready money rather than on credit. The co-operative system tends also to educate the operative classes in principles of self-reliance and honest labour, and in an acquaintance with the difficulties which have to be encountered in the management of business. These various good tendencies entitle the movement to favourable consideration, and to any fair opportunity of developing itself and proving its fitness for general adoption. I contend, however, that that fitness is not yet proved. The plan of co-operation, though so available and beneficial under some circumstances, does not seem equally so under others. It may succeed, for instance, in cases where the several co-operators contribute equally to the results produced; or where the management of the business is comparatively simple, the sunk capital small, and the returns pretty regular. But in businesses which are different as to these several particulars, the general adoption and success of the system will be more unlikely. When, for instance, the workpeople contribute different kinds and quantities of labour or other aid, a difficulty must be likely to arise about apportioning to them their respective shares of remuneration. To make a really just and satisfactory apportionment would require a more general and accurate knowledge of the several elements of value,—both of labour and goods,—than any man can have before actual experience. Again, as to business management, it is no disparagement of the operative classes to say that they cannot be expected to have the qualities necessary for the management and direction of a large business,—qualities which are almost invariably the result of special training and experience. Of course these qualities might be hired at a commensurate remuneration, but there will still be a disadvantage in their exercise when compared with that in the case of an individual or firm ever on the look out for favourable opportunities, vigilant, enterprising, and speculative. There are obvious difficulties, too, in the way of members of the operative classes, or those only immediately above them, saving or borrowing sufficient sums to form the sunk capital of an enterprise of great extent; and also in their inability to bear the far-reaching consequences of a failure. The system seems to presuppose more extensive knowledge, more acquired mental power, and more self-control than the operative classes in any country can be expected to possess. It has often been observed that the co-operative principles succeed better in the business of distribution than in that of production; and the explanation of the diffesence is in what I have stated. Lord Derby, in opening the recent Co-operation Congress at Leeds, very fairly acknowledged the difficulty in the way of co-operation as applied to farming. He said, "The question arises,—have you got the men? Men accustomed to work,—willing to put themselves under orders, though they are their own masters, and intelligent enough not to be disheartened, and throw up the game if they are not lucky at the outset. If you can find men of that sort the experiment will probably answer; if you cannot it had better not be tried." These words must commend themselves to every one's good sense; but the difficulty which Lord Derby sees in the case of farming, together with other difficulties, is, I think, to be feared more or less in other branches of industry as well. Again, as there are many lawsuits which cannot possibly be settled "by the marriage of the litigants," so there are many social interests which may not really conflict, but they cannot possibly be amalgamated. To see what I refer to I would only ask the Section to reflect on the vast mass of productive interests at the present moment which are the result of that individual effort, for which no adequate place is found in the system of co-operation. Look at our great capitalists, our great business-managers, our industrial chiefs, who, by the dint of individual and personal fitness, take and hold their position of eminence in manufacturing and commercial life. I ask what place is there for such in the system of industrial co-operation? Or is it supposed that the rise of such chiefs will cease? I trust that we have no hopes of any such dead level. Combined effort, indeed, has its great field of achievement, as exhibited in our railways and various joint-stock undertaking; but it is only under certain conditions and within certain limits that it is superior to or even equal to individual effort; and even where combined effort is most successful, how often is its inception really the triumph of individual genius and perseverance. Again, there is a certainty, at all events, that the practice of accumulation will not be carried out by all persons in the same degree; for all have not the same will and ability. There will, therefore, be here and there among men various amounts of wealth, and the owners will often be persons who will prefer to employ their capital themselves independently, to throwing it into a common concern. In such cases, at least, the old distinction between employers and employed will necessarily survive. On the whole, then, it seems to me that although the co-operative system has much to recommend it, and if it were only for the high aims of many of its promoters, it ought to receive favourable consideration as an attempted solution of the wages-difficulty, yet that it is far from being universally applicable; and that we should be careful before we make up our minds to regard it as the ultimate form of industrial life. Another system, to which, in the last place, I shall refer, which has been proposed, and to some extent put in practice, for securing harmonious relations between employers and workpeople, is that known as the system of industrial partnership, or participation in profits. Under this system the workpeople are paid a certain wage, adjusted as nearly as possible to the condition of the labour-market, and there is given in addition a further sum proportioned to the success of business and the degree in which they have severally contributed to it. Instead, however, of considering this addition as a share of profits, it will be better to regard it as an increase of wage on account of more efficient labour; for nothing can conveniently be termed profit but the employer's share. This system, though not without its difficulties, has very considerable advantages to recommend it. It is favourable to production, for under it every workman has a direct stimulus to increased and careful exertion; it tends beneficially to the development in him of whatever may be his peculiar talents, and to the strengthening of the principles of emulation, self-reliance, and self-respect; his interest being so closely connected with his own character and conduct; and it also tends to conserve and pro-

mote good feeling between employers and employed, all having more or less an obvious and common and real interest in the success of the business. Besides, under this system, the direction of the business is left in the hands of those most competent to conduct it; the cost of production is lessened by the diminished need for superintendence; and, lastly, in the case of failure, an intolerable burden does not fall on the humbler workers, their loss being limited to an interruption of employment. The plan, as I have said, no doubt has its difficulties; difficulties as to the ascertaining of the fixed wage to be started from or adhered to; and the working of an efficient check and rule for measuring the claim of each workman to additional pay. In adjusting such claims regard must properly be had to the nature and circumstances of the business, including the amount and duration of the employer's outlay, some parts of which are of a stated character, as the amount of fixed capital which he had to provide, and others, as the cost of raw materials, varying from time to time. Account, in short, must be taken not so much of the general success, as of that portion of it which is due to the efficiency and diligence of the workpeople. The adoption, however, of a sliding scale, under which the increase of pay bore some constant relation to variations in the selling price of the goods produced, would perhaps be fair and satisfactory; for, in estimating the value of labour, we can scarcely disregard the value of its product. The several difficulties to which I have alluded will no doubt require attention; but they are, I feel, such as may be overcome in practice, and I believe are considerably overcome where the system is fairly in operation. Of course, under this system, should any question arise either as to the stated wage or the apportionment of extra pay, it can most properly and wisely be referred to arbitration. In expressing, for my own part, a decided preference for this system as the most hopeful, which preserves the natural distinction between employers and employed, leaving to the former the direction and management, and securing to the latter an interest in the results, I still would not be understood as desiring in the least to detract from the claims of any others. Various systems such as I have named will each and all find fields for development in our social life; and in so far as they have capabilities and fitness should all be encouraged by being allowed fair play. Natural powers and laws will work out their own results, and prove the best system paramount; but it is as difficult for us to predict and define the future form of social relations as to know the precise shape of the tree which is yet to spring from the acorn. What is especially to be desired in these matters is the prevalence of full and free competition, both for systems and individuals; human law taking care that none violate the rights of another; and moral and divine law being so honoured and influential that no persons will have the wish to do so.

Mr. Jeremiah Head, of the firm of Fox, Head, & Co., ironworkers, Middlesbrough, said he had some experience with regard to the question before them. About eighteen years ago some other gentlemen and himself established those works. After two years they found that they lost about a quarter of their total time in strikes, and in a fit of desperation they adopted a scheme, which had been advocated rather strongly by the author of the paper, called "industrial partnership." They adopted it for three years as an experiment, and as nothing particular occurred to induce them to make any change, they continued the system for other five years, and having experienced good times, it being from 1870 to 1874, they were enabled to distribute in the shape of a dividend to their workmen some 6,000*l*. He was sorry to say that at the end of five years they found that it was not to their interest to carry it on any longer. Many of their men became connected with trade-unionism, and as the unionists were adverse to the system that had been so successfully in operation, it came to an end, and there was now a Board of Arbitration and Conciliation, where the men and the masters are equally represented, and matters relating to their interests discussed and settled. It was, in other words, a place where a method of haggling went on, and the real thing that apparently regulated it was the state of trade at the time. He was satisfied, after much attention to the subject, that industrial partnership or industrial co-operation would never be successfully carried on, the men being unfitted for the commercial portion of the business to make it a success; but co-operation, in the form of co-operative stores, where they were their own customers, and were not obliged to seek customers in distant parts, was a system that had been successfully tried, and he could recommend it to the working population.

THE FORMATION OF COAL.

MR. EDWARD WETHERED, F.G.S., F.C.S., read a paper on the above-named subject, before the Geological Section of the British Association last week. The author first reviewed the researches of Hutten, Göeppert, MacCulloch, Sir James Hall, Sir W. Logan, and Dr. Dawson, and then summed up the conclusions now entertained as to the formation of coal, as follows:—1st. That the beds of fireclay which underlie all seams of coal, represent the original land-surfaces upon which the coal-forming vegetation grew. 2nd. That the stigmaria found in the underclays were the roots of that vegetation, which implies that the plants were of the Lepidodendroid order. 3rd. That the vegetation grew near the mouths of great rivers, in swampy ground, and there underwent submergence; changes then took place which converted the vegetable matter into coal. 4th. That the change of coal from one variety to another, even in the same seam, is the result of metamorphism, and is indirectly caused by the contortion of the surrounding strata, whereby facilities for the escape of gases evolved by the vegetable decomposition have been produced. The author's exceptions to the above were,—1st. That coal was not formed from vegetation of the Lepidodendroid type, and that therefore the stigmaria found in the underclays are not the roots of the vegetation which gave rise to the coal, unless it was from the spores of such plants, which the author considered wanting in proof, though seams of coal did undoubtedly contain spores. 2nd. That the varieties of coal and the change which sometimes takes place in one and the same seam are not due to metamorphism, nor are they dependent upon the contorted state of the surrounding strata, but arise from the greater or less chemical decomposition of the vegetable mass, influenced by the circumstances under which it was submerged. The reasons which had led up to these conclusions were:—1st. That we have proof of other vegetation during the coal-period besides the Lepidodendroids, but their roots have not been preserved, owing to their being of a more perishable nature than the stigmaria. 2nd. Beds of underclay are frequently met with full of stigmaria, but are not followed by seams of coal. 3rd. Coal must have been formed from a compact mass of vegetation, such as could not have been produced by large trees (as the Lepidodendroids were) growing *in situ*. The uniform thickness and comparative freedom from inorganic contamination would demand a mass of vegetation into which only a limited amount of sediment could penetrate. 4th. The finding of a fossil-tree standing *in situ*, upon which so much stress had been laid by some authors, is a rarity. Though the author had spent much time underground in collieries, and seen hundreds of fossil trees drifted into the position in which they have been found, he had only twice seen instances of them standing where they have grown. 5th. If seams of coal were formed from Lepidodendroid trees the tough base layer would be easily detected, which has never been the case in any true bed of coal. 6th. If the stigmaria found in the underclays represent the roots of the coal-forming vegetation, we should expect to find the fructifications immediately over the coal, which is not the case; with the exception of cordaites (which, in the author's opinion, was a reed), remains of fossil flora are not found for the first 2 ft. or so over the coal. After a careful investigation underground of the conditions under which coal was formed, the author has arrived at the following conclusions:—On the land grew the vegetation of the period, represented by lepidodendrons, sigillaria, calamites, &c. As the land sank and the waters encroached, the land vegetation gradually disappeared, but the roots remained in many cases, and those which offered the great resistance to decay are the ones preserved in a fossil state, hence the occurrence of stigmaria. As the waters advanced, the ground would become swampy, and then we might expect to see spring up reeds, mosses, and other vegetation suitable to the changed condition. It is to vegetation of this kind that the author ascribes the formation of coal. Reference was then made to the Presidential address of Professor Ramsey to the British Association in 1880, in which the recurrence of the same kind of incident through geological time was advocated. The author then asked, why the coal formations of the carboniferous period should be an exception, seeing that the modern lignites and deposits of peat were instances of coal in the progress of formation. It was then pointed out that these deposits were not composed of large trees, but of a lower order of plants. Coming to the varieties of coal and the change which sometimes takes place in this respect in one and the same seam, it was shown that the difference between bituminous and anthracite coal was that the latter contained a greater proportion of carbon and a less amount of volatile matter than the former. It was then contended that if the decomposition of the coal-forming vegetation took place without being affected, to any extent, by minerals capable of oxidising the carbon, a coal would be formed having a large proportion of carbon with a less proportion of volatile matter than is found in bituminous coal. The author explained this by briefly reviewing the process by which vegetable matter has been converted into coal. It chiefly depended upon the amount of oxygen which could unite with the carbon for carbonic acid, and the amount of hydrogen which could unite with the carbon to form marsh gas. By this process oxygen and hydrogen would pass off in greater proportion than the carbon, thus increasing the proportion of the latter to the whole. If, however, the submerging waters placed in contact with the vegetable mass substances capable of supplying oxygen to the carbon, then there would be a decrease in the proportion of the latter, and what the author termed "fixed oxygen and hydrogen" would increase in proportion to the whole, and give rise to a coal of a bituminous nature. With a view of ascertaining whether the chemical composition of the beds overlying a seam of coal which has changed from bituminous to anthracite also changed, the Welsh "9-ft." seam was selected, which, near Cardiff, is semi-bituminous, and at Aberdare becomes anthracitic. Specimens of the overlying strata were selected from the two districts at each foot above the coal for 5 ft.; these were analysed, and it was found that the beds from near Cardiff were considerably more argillaceous, and, as a whole, less ferruginous than those at Aberdare. It would be rash to attempt to determine the exact chemical nature of the sediment deposited over the coal-forming vegetation in the two localities, as, with the exception of silicate of alumina, the silicates and other minerals would have undergone decomposition at the expense of the carbonic acid given off from the coal-forming vegetation. There was, however, a decided change in the beds of the two sections presented, which could not be ascribed to metamorphism. It rather appeared to point to the sediment containing different constituents, which must have a very considerable effect on the vegetable mass. It was to this that the author was inclined to assign the change in the character of the coal.

A NEW FORM OF LIGHTNING CONDUCTOR.

BEFORE the British Association meeting at York, last week, a paper by Mr. Samuel Vyle, Associate of the Society of Telegraph Engineers, "On a new Form of Lightning Conductor," was taken as read, he being absent, with Mr. W. H. Preece, F.R.S.; Professor Adams, F.R.S.; Professor Symons, F.R.S., and other gentlemen interested in the subject, testing the lightning conductors on the Minster. The paper referred to the damage caused by recent thunderstorms, and pointed out that experience and the opinion of scientific authorities went to show that a lightning-conductor of sufficient capacity, when properly fixed, and having good contact with the earth, was a certain protection against lightning. The radius protected by each conductor was still a matter of controversy, but it appeared that a conic section equal to its height was within the bounds of safety. Referring to the repeated utterances of scientists as to the absolute necessity of testing lightning-conductors, in order to know their condition, the author indicated the difficulties that existed in getting these tests made, which were both costly and dangerous, a wire from the ground to the top of the conductor being necessary before the elec-

trician could commence; on lofty places and high spires this was conspicuous. Recognising this difficulty, last year Mr. Vyle was led to the invention of the new form of conductor which he exhibited. It was, in fact, a copper cable, with an insulated wire set within the core, which, being metallically connected to the conductor at the top, offered a ready means of testing it whenever desirable, the lower end of the inner wire being always within reach. Having, then, this testing-wire, it became necessary to provide the means of measuring its resistance, and this has been done by a differential galvanometer, fitted with three keys. The depression of two of them separately sends currents up the testing-wire to the top of the conductor, down which it passes to the earth, and also through an artificial circuit of resistance exactly equal to that of the wire and cable referred to. The indicating-needle is deflected to the side of the key depressed. If, however, both keys are pressed down at the same time, the needle will remain stationary or balanced, thereby proving the conductor good. In case the needle is deflected the third key is brought into use, and being depressed at the same time as the first proves whether the conductor is good, or the fault to be looked for above ground.

VISITS AND EXCURSIONS BY THE BRITISH ASSOCIATION.

THE Jubilee meeting of the British Association in York appears, as we have already said, to have been a very successful gathering. We have given reports and summaries of some of the addresses and papers read in the sectional meetings, but, besides the instruction provided for members and visitors indoors, visits to manufactories and public works, and excursions to places of antiquarian interest and natural beauty or picturesqueness, were organised in great number. We append a few notes of these visits.

York Gas Works.—At the York Gas Works, Monkgate, visitors were conducted by Mr. Charles Sellers, secretary, who explained the whole process of gas manufacture, and said his company used the same kind of Durham coal as was chiefly used by the London companies. They used lime exclusively for purification. The old lime is sold to agriculturists, it being an excellent fertiliser. The coke-breaking machine attracted considerable attention. By it coke is broken and screened, and made suitable for domestic purposes. It may be stated that York was first lighted by gas in 1823, and the present gas company was amongst the first in the country to sell gas at so cheap a rate as 2s. 6d. per 1,000 ft.

The Buckingham Works.—These works, the factory of Messrs. T. Cooke & Sons, the well-known astronomical and mathematical instrument makers, were also visited. The premises stand on Bishophill, on the site of the palace formerly belonging to the Dukes of Buckingham. These works were built twenty-five years ago by Thomas Cooke, originally a schoolmaster, whose mathematical talent earned him a wide reputation among men of science; and his memoir written by Colonel Strange for the Royal Astronomical Society of Great Britain is a fitting tribute to his genius. He died in November, 1868. A great portion of Messrs. Cooke's work is done for use abroad, instruments from these works having been used for the Indian Government Ordnance Survey, for measuring the Pyramids, and for many scientific experiments in other latitudes.

Central Saw Mill.—Apart from the work which is carried on in the Central Saw Mill, Newgate, the building itself is of some interest. It was erected on the ruins of a house of the same name. Previously to its destruction by fire, about seventeen years ago, the upper part of the building was of timber. The walls of the lower part mostly remain. The building is stated to have been of the fourteenth century, and had at the end, where the present doors are, an original archway, and there were two curious windows, one of which is yet to be seen. It has by some been thought to have been a prison for offenders within the precincts of the court, while others have held that it was a chapel. The "Vicars Choral," however, "had a house, said to stand over against the churchyard of St. Sampson, where they antiently lived to go there and kept hospitality in their common hall." But to whatever purposes or uses in ancient times this building has been devoted, it has for the past thirty years been in the occupation of Messrs. Charles Ernest & Co., who have carried on the manufacture of every description of drawer and door knobs or handles, also croquet, tennis, racquets, cricket bats, &c. The business of general turnery is carried on in these premises, and some of the machinery is interesting.

Ebor Works.—At the Ebor Works of Messrs. Varvill & Sons, North-street, the manufacture is extensively carried on of planes of every description for joiners, shipwrights, coach-builders, &c.; also all kinds of tool handles. The principal kinds of wood used are beech, box, ebony, and sycamore, all of which is bought in the round timber, sawn up, then steamed for twenty-four hours, after which it is cut up into stocks, and laid away for two years to season. Then it is worked up into tools. This firm also make plane irons of all sorts, and most of the processes may be seen in operation.

York New Waterworks.—Considerable improvements have lately been made at these works. It seems that in the year 1682, during the reign of Charles II., waterworks were first established in the Lendal Tower, adjoining Lendal Bridge. A pumping-engine, worked by two horses, was placed in the tower, by means of which a scanty supply of water was furnished to the citizens every week. The mains at that time were the trunks of trees hollowed out and fastened together, and laid down in the streets. This primitive state of things went on for nearly a century, when the works were purchased by Colonel Thornton, who made considerable improvements in the service of water. At his death the property came into the possession of his son, also a colonel, when a steam-engine was introduced, the building enlarged, and hot and cold water baths were provided in a house adjoining the tower, and these baths are still in existence. Colonel Thornton, in 1799, sold the waterworks, and the purchase-money was provided for by the issue of eighteen shares. The new proprietary effected other improvements. They raised the height of the tower, and made it 58 ft. 6 in. above the summer level of the river. The steam-engine was of eighteen horse-power, raised 16 gallons of water per stroke, the number of strokes being eighteen every minute. The water thus pumped was at the rate of 17,280 gallons per hour, or 207,360 per day of twelve hours. An extra pipe was placed to convey any surplus water into a tank beneath the tower, the floor of which was about 7 ft. below the bed of the river. At the beginning of the present century the population of York was rapidly increasing, and houses were multiplying in all directions in the suburbs, rendering it impossible for the company to overcome the difficulties with which they were beset, owing to the limited character of the resources at their command. A new company was accordingly formed in the year 1846, and the works of the old company were purchased under the authority of an Act of Parliament, which authorised the creation of a capital of 60,000*l.*, with borrowing powers to the extent of 20,000*l.* on mortgage. The new company secured a suitable site at Acomb Landing, adjoining the river, a few hundred yards higher up than Clifton Scope, and upon the spot was erected a commodious building, in which were placed two powerful steam-engines for the pumping of water from the river. Outside the building were provided two subsiding reservoirs and three filter-beds, as well as tanks, conduits, pipes, and other apparatus for raising the water from the river, and afterwards lifting it to the high service reservoir on Severus Hill, to be thence distributed through the city. The two steam-engines are each capable of working to about sixty horse-power. The filter-beds are constructed on a similar principle to those which were first suggested and put in operation by Mr. Simpson, at the Chelsea Water Works in 1828. Three of the filter-beds are 60 yards by 20 yards each, and one circular. The depth of the beds is 6 ft. from the face of the sand, and 5 ft. below for the filtering medium, which consists of 2 ft. 6 in. of fine river sand for the top layer, and the same depth of various sizes of gravel for the lower layer. Three of the beds are generally in use at one and the same time. About 62,500 gallons of water are filtered every hour. In 1876 such was the increased consumption and demand for water that the company obtained an Act of Parliament to extend their works, and new capital was created for the purpose. Recently a new engine-house, 42 ft. long, 21 ft. broad, and about 40 ft. high from the floor to the roof, has been erected, and also a boiler-house in connexion therewith, in the Tudor style, with a chimney 115 ft. high. It is supported at the base by buttresses at each angle, and the upper portion is octagonal in shape, and terminates with a battlemented coping. The whole of these buildings are of brick with stone dressings. In the new engine-house have been erected two powerful engines of 40-horse power each, and both are provided with a filter water-pump, and also a river water-pump, capable of raising from the river each 931,600 gallons per day of twelve hours, and sending the same amount of filtered water daily into the service reservoir on Severus-hill for the supply of the city. The two engines combined are therefore able to send 1,863,200 gallons of water per day for the use of the citizens, and this immense amount of water we understand could without any difficulty, in case of necessity, be increased to 2,000,000 gallons per diem. In addition to this, the old engines, which have done their work well so long, are still employed. In the new boiler-house have been erected four boilers, provided with smoke-burners.

York Glass Works.—The York Glass Works, Fishergate, are the oldest and most important in the district: medical bottles are the chief speciality, and these are shipped all over the world. The manufacture of bottles and other vessels of glass was not introduced into this country till 1557, and it did not make much progress till 1690, in the reign of William III. The art of glass-making was early practised in York. Drake, the historian of York, says that a "glass-house" was first erected in a lane near Margate; that the manufacture was continued for some time, but at length discontinued,—probably about the close of the seventeenth century. A local halfpenny was some years ago found, bearing the inscription "York Glass Manufactory." Part of the works of the York Glass Company, Limited, were erected in 1794. The business, although on a small scale, was a prosperous one; but it was not until 1864 that the present company was formed. The works have since then been considerably enlarged. Several warehouses and workshops have been built, and the furnaces altered and adapted to more modern principles and the latest improvements in glass manufacture. The works (according to the *York Herald*, from which journal we cull some of our particulars) are built on the site of the ancient priory of St. Andrews, Fishergate. The abbey was situated between Blue Bridge-lane and the present works, and the river Foss, and the high-road to Fulford. A portion of the Priory walls may still be seen in the boundary-wall in Blue Bridge lane. The abbey or priory of St. Andrew was founded in 1202, by Hugh Murdoc, archbishop of York.

Railway Carriage Works.—A party of gentlemen were conducted over the carriage and wagon shops of the North-Eastern Railway Company by Mr. Elliot, the superintendent of the carriage department. The visitors were first conducted through the framing department, and were shown the machinery for mortising, tenoning, boring, &c., the several parts, all which machines, as may well be understood, are constructed with a view to the greatest possible economy of labour. The great strength of the framework of the under-carriages was a matter of curiosity and interest. A powerful mortising machine, by Messrs. Powis James, Western, & Co., of Lambeth, was the subject of a good deal of interest, on account of its great power and precision in cutting with easy application. The body and trimming and painting departments were next inspected, and this being done, the construction of the solid wheels was explained, and it was stated that a composite carriage was generally estimated to last about thirty years, the cost of construction being 400*l.* The smiths' shops next came under notice, and looked even more busy and animated than the carriage shops. The departments allotted to the manufacture of the company's lurreys, as well as the wagons for various descriptions of traffic, were shown in succession, and it was explained that the force employed were able to construct something like 100 wagons a week, and that 30,000 had been built during the last ten years. After a rapid inspection of the "hospitals," or repairing shops for carriages and wagons, the party were much interested by an inspection of the Westinghouse brake, an engine and carriage being coupled and put in motion to show its operation. The explanation, with a dissecting of the parts of the valves, &c., was a matter of considerable interest, and afforded a good deal of satisfaction to the visitors. After this Mr. Elliot conducted the party through the extensive

sheds for storing and drying the timber used in the construction of the various kinds of vehicles.

North-Eastern Railway Locomotive Works.—The Locomotive Department of the North-Eastern Railway was also visited, by permission of Mr. Stephenson, the superintendent. The department, which occupies a block of buildings at the end of Queen-street, near the old station, employs between 300 and 400 men, and though devoted chiefly to the repairing of locomotives, is provided with plant sufficient for their manufacture. The first place entered was the boiler-shop. The fitting-shops were next shown. After a survey of the varied work done here, the machine-shop, with its numerous and intricate machines for drilling, planing, cylinder-boring, &c., occupied considerable attention. The pattern-shop having been visited, the arrangement for fixing the tires of wheels was next examined. The smiths' shops were next viewed, and then the new buildings for fitting and erecting engines were arrived at. Thence the party proceeded to the goods warehouses in Leeman-road. Here a great saving of horse-flesh was noticed in the extensive use of hydraulic power. The large new engine-sheds were the last portions of the works visited. These sheds have standing-room for about sixty locomotives, a fine being placed over each stand, thus keeping the building clear of smoke.

Excursions.—On the 3rd inst. there was an excursion to Castle Howard, the seat of Mr. George Howard, M.P. Here the valuable collection of paintings and other works of art was inspected. The design of Castle Howard was by Sir John Vanbrugh, afterwards the architect of Blenheim House, Oxfordshire. The south front is 323 ft. in length, and consists of a centre and two wings. The centre has a pediment and entablature supported by fluted Corinthian pilasters, and is approached by a broad flight of steps. The north front has also a centre of the Corinthian order, with a cupola surmounting it, and two wings, the west one being the design of Sir James Robinson, and differing in style from that on the east. Helmsley, Duncombe Park, and Rievaulx Abbey were also visited on the same day. Permission had been obtained to drive through Duncombe Park, which is well belted by trees and stocked with deer and shorthorns, and from which most extensive and varied views of the country can be obtained. As the ruins of the Hall were inspected, there was a general feeling of regret that so fine a building with its art treasures should have fallen a prey to the disastrous fire which occurred three years ago. This structure was in the Doric style of architecture, and was the design of Sir John Vanbrugh. The rebuilding of it will shortly be recommenced. Rievaulx Abbey was described by the Rev. C. N. Gray, vicar of Helmsley. There were also excursions to Scarborough, Harrogate, Brimham Rocks, and other places of interest. In spite of the very wet weather, which mostly prevailed, each of the excursions attracted two or three hundred ladies and gentlemen, who, from the published accounts, seem to have successfully emulated Mark Tapley in being jolly under difficulties.

THE SOUTH HORNSEY LOCAL BOARD'S NEW OFFICES.

THERE are few suburban localities around London which are increasing at the same rate of progress as the neighbourhood of South Hornsey. The district under the management and control of the South Hornsey Local Board covers a very large area, stretching something like two miles from south to north, and from Stoke Newington to Finsbury Park between east and west. Within this extensive area several hundreds of houses have been erected within the last two or three years, many of them of the villa character, and at the present time building is still going forward in the district on a very large scale.

The continued expansion of the neighbourhood has induced the Local Board to erect new public offices, and the buildings have been in progress during the past three or four months. The site of the offices is in Milton-road, not far from the centre of the Board's district. Although the structure is already considerably advanced, the formal ceremony of laying the memorial-stone has only taken place during the present week, the Chairman of the Board having performed that office on Thursday afternoon, in the presence of the members of the Board, and about 200 invited guests. The building, which is in the modern Classic style of architecture, and in Portland stone, has an elevation to Milton-road 70 ft. in length, and 40 ft. in height, containing the ground-floor and a lofty story above, with dormers in the roof. The ground-floor portion of the elevation has ornamental pilasters with Ionic capitals, the floor above also being faced with similar pilasters and composite capitals. Each floor contains a range of arched windows, those on the story above the ground-floor being eight in number. Above the ground-floor there is a projecting cornice, and the elevation is surmounted by a balustrated parapet. A central porch, 12 ft. wide by 5 ft. deep, with an arched door and gateway, leads into an entrance-hall, 20 ft. by 12 ft., the wall of the entrance-hall having pilasters, and the floor is laid with encaustic tiles. The ground-floor contains, on the right and left of the entrance-hall, the clerk's and the surveyor's offices respectively, together with the inspector's office, the general offices, and strong-room. A staircase, 17 ft. wide, in Portland stone, with an ornamental balustrade, leads to the board-room on the upper floor. This apartment is 43 ft. by 23 ft., and is 17 ft. in height to the ceiling, which is coved and panelled, and has three sun-burners. The walls are enriched by twelve columns. Adjacent to the board-room are two large committee-rooms, together with waiting-rooms and lavatories. A portion of the building is intended to be finished and fitted as the residence of the board's surveyor.

In addition to the new office buildings as above described, a separate building close adjoining is to be erected as the fire-engine station. This building will likewise have its frontage to Milton-road, the elevation being in Portland stone, and though plainer in character, uniform to some extent with the new offices. In addition to the standing space for the fire-engines, the building will contain the fire brigade superintendent's apartments, whilst at the rear will be the stables and yard. The buildings also include a mortuary for the purposes of the district, which will be erected at the east side of the fire brigade stables. The whole of the buildings and grounds when completed will cover an area of 140 ft. in length and 96 ft. in depth.

Mr. E. Fry is the architect of the buildings, and Mr. S. Goodhall, of Stoke Newington, the contractor, Mr. W. R. Smith being foreman of the works. The cost of the buildings will be about 9,000*l.*

THE NEW PEABODY BUILDINGS.

SOME of the largest blocks of buildings which have yet been erected by the Peabody trustees are at present in progress in different parts of the metropolis. One of the most important of the blocks is that which is now being erected on the spacious plot of ground situated between Drury-lane and Great Wild-street. These buildings, which are now far advanced towards completion, consist of thirteen distinct structures in four main blocks, one facing Drury-lane, one in Kemble-street, a third facing Great Wild-street, where will be the principal entrance, and the fourth block stands within the ground. The buildings contain in all 819 rooms, forming 312 tenements of two or more apartments each, in addition to 175 single rooms. The buildings are six stories in height, and, like all the rest of the erections of the trustees, are in white brick. Four blocks, containing 280 rooms, are also nearly ready for occupation in Bedfordbury; whilst fifteen large buildings of a similar character are in course of erection on the Pye-street site. In addition, operations have just been commenced on the Whitecross-street site, and also on the site in Westminster, in the rear of the south side of Victoria-street. The Westminster site is between one and two acres in extent, and the blocks about to be erected upon it will be amongst the most extensive of the buildings belonging to the trustees. Ten blocks, comprising altogether 610 rooms, have been opened during the present year in Glasshouse-street, and the trustees state that before the close of the year they expect to have provided in addition to their tenements already occupied, accommodation for 760 families, or upwards of 3,500 individuals. The average rent of the Peabody Buildings all over London was estimated at the close of last year to be 4*s.* 4½*d.* per week for each dwelling, or at the rate 1*s.* 11½*d.* per room. Messrs. Cubitt & Co. are the contractors for the whole of the several blocks now in course of erection, under the direction of the trustees' architect.

MAIDS MORTON CHURCH.

BUCKINGHAMSHIRE is by no means a rich county for the ecclesiologist, and it is somewhat singular that in such a purely agricultural district the towns should be so remarkably uninteresting, and the churches should have fared so badly. Yet, somehow or other, the important towns in Buckinghamshire seem to have been deprived of their ancient churches about a century or so back, and for what reason it is impossible to say. Buckingham has lost its ancient church, and in its place we find a strange building, consisting of a Batty Langley tower and spire, a slice of a "Georgian" nave, and the residue Revived Gothic. At Stony Stratford we find a solitary old tower and a Brummagem Gothic church, which we have been told is to be rebuilt. It is true Stewkeley, Hillesdon, Stoke-Golding, Chetwode, Langley, Burnham, Eton College Chapel, and Olney spire serve, to a certain extent, to prevent our saying that there are no churches worth seeing in the county, and we will add to the list Maids Morton Church. This remarkably pretty little church is situated just one mile from the singularly uninteresting town of Buckingham,—the *beau ideal* of a thoroughly dull English town, with its ugly church, ugly town-hall, innumerable inns (there appears to be a drinking-shop of some kind or other to every four or five dwelling-houses). We see also the dull-looking shops with their stale fly-blown goods; the awfully respectable houses of the aristocracy of the place, and the "genteel villas" of the retired tradesmen, &c. A Continental town of the size would have its theatre, its *café*, its pleasure-garden, its concert-rooms, its band of music, its museum, and probably its picture-gallery; but in our English country towns there is absolutely no amusement provided for the people, and hence the innumerable public-houses.

Maids Morton Church is dedicated to St. Peter, and, although only a small building consisting of a single nave and chancel, small sacristy or vestry, a west tower and two porches, yet exhibits many features which are not commonly to be met with in village churches. Lysons gives the date of its erection at "about the year 1450." We confess we should be inclined to suggest a later date, judging from some of the detail. It is said to have been erected by two maiden ladies, daughters of the last Lord Peyvre, and there is much in the appearance of the building to favour this idea. No ordinary village church would have been constructed with the care and skill bestowed upon Maids Morton. The whole building, both within and without, is of ashlar, very neatly jointed, and laid in quite regular courses. The roofs of the nave and chancel are of oak, excellently carved and richly moulded. The porches, tower, and sacristy are vaulted in stone, with fan tracery. There is a good rood-screen, and a Norman font, ornamented with a kind of decoration resembling the expanded leaves of the sun-flower. There is a little stained glass, a Jacobean squire's pew, and a Communion-table of Charles II.'s period. The most beautiful object, however, in the church, is the remarkable sedilia, with rich projecting canopies, and an old painting of the Last Supper, extending across the back of the niches.

There are, however, one or two features about this building to which we would call special attention. They are, in the first place, the very original treatment of the belfry story of the tower. Contrary to the usual practice in England, the splay of the windows is external, and the great mullion in the centre is nearly the depth of the wall. The cusping of the enclosing arch is also rather uncommon.

The second feature which deserves attention is the very remarkable canopy over the western doorway, forming a kind of hood or hanging porch. Its design and treatment will be better understood from the sketch we give of it than from any amount of description.

The vaultings of the two porches and the sacristy also deserve special notice. They are remarkably elaborate examples of fan-tracery, and bear a strong resemblance to the vaulting of the two chantry chapels on either side of the choir of St. George's, Windsor. It is somewhat remarkable to find such work in a village church, and for this reason we are led to the conclusion which we have already alluded to, that Maids Morton Church may be looked upon rather as a "votive" church than as a parochial or village church.

The whole floor was originally composed of encaustic tiles, many of which remain. The monuments are not interesting. The stone which covers the grave of the two sisters who erected this beautiful building is situated in the middle of the nave; it formerly bore the brass effigies of two females, but these have disappeared.

It is stated that, within the memory of some now living in the village, every window of this most interesting church was full of stained glass, and the nave seated with carved oak benches; very little old glass, however, now remains, and the oak benches have given place to wretched deal pews!

NEW STABLING AND OUT-BUILDINGS, "THE LODGE," WALMER, KENT.

THESE buildings have been erected for Mr. Alex. Tod, from the designs, and under the personal superintendence of Mr. James Neale, F.S.A., of Bloomsbury-square, London. The main block comprises loose-boxes and stables for five horses, large coach-house, harness-room, five living-rooms and water-closet for the coachman, cistern, and box-rooms. Care has been taken that no living-rooms should be over or in any way connected with the stables. Separate accommodation is provided for the groom on the ground floor. There are lofts over the stables. The *flèche* is for ventilation, which is carried out on the Tobin system.

The out-buildings comprise cow-house, dairy, fowl-house, coals, wash-house, piggeries, earth-closets, &c. Special arrangements have been made for feeding the cows, and for taking the eggs from the hens' nests without disturbing the fowls. There is a loft over the cow-house, and also a loft over the fowl-house used for pigeons; the *flèche* shown on the drawing is the exit of the pigeon-house.

The walls, which are built hollow, are faced with Kentish rag, with gauged red brick quoins, sills, and dressings. The rag is hammer-dressed and laid in thin courses, varying from 2½ in. to 4 in. in thickness; the courses are brought to a horizontal bed at every 18 in. This means of laying the rag is similar to that used in some of the old churches in Kent. It has a quiet pleasing effect, and gives proportion to the buildings. The rag was prepared at the quarries of Messrs. Benstead & Son, at Maidstone.

The external timber work is painted a cream white, and the panels are pebble-dashed with small pebbles obtained from the beach.

The roofs are covered with the rich red tiles manufactured by Messrs. S. & E. Collier, of Reading. The hip-and-valley tiles have been purposely made from the architect's drawings to work with the tile courses. There are also purpose-made angular hanging tiles which overlap the angles of the dormers and prevent the wet driving in between the wood frames and the side tile hanging.

The facing bricks used are of a dark red colour, made by Mr. Charles Richardson, at Teynham. All the bricks have been rubbed. The moulded brickwork shown on the drawing is cut, rubbed, and set in putty.

The stables are fitted with all the modern appliances by the St. Pancras Ironwork Company. The wood is of pitch-pine. The space above the mangers is lined with delicate green tiles, and above is a frieze of salmon-tinted stamped plaster.

The stable yard is laid with blue brick, manufactured by the Kent Brick and Tile Company, at Pluckley.

There was no contract, with the exception of the stable-fittings, and, therefore, no temptation for "sea-side jerry building."

Mr. Redman, the clerk of works, engaged labour and material. Amongst the other trades not already mentioned were Messrs. Frost Bros., of Deal, for gas, water, and general plumbing; Mr. Steriker Finnis, of Dover, timber; Messrs. White Bros., London, cement; Messrs. Crease & Son, London, colours, &c.; Messrs. T. Potter & Sons, London, ironwork, gates, &c. Mr. William Webb acted as foreman; and Mr. Thos. Pulling undertook the painting and decorative work.

The stabling is well situated close by the sea, and surrounded by fine trees. There is to be telephonic communication between the stables and the house. The house, of which we may speak hereafter, is about 200 yards distant. It is now drawing to completion, having been enlarged at considerable expense from the designs of Mr. Neale.

PORTAL OF THE CHURCH OF SANTA MARIA, BELEM.

ABOUT two miles and a half from Lisbon, on the right bank and towards the mouth of the river Tagus, there existed during the middle ages a place called Restello, opposite the first and safest anchorage-ground for vessels after passing the bar of the port, being nearest to that for vessels preparing to leave for the Atlantic. On this spot the Infante Dom Enrique founded a small hermitage, and gave it to the Jesuits, of which body he was the administrator-general, with a view of rendering temporal and spiritual aid to mariners. Vasco de Gama, before starting on his momentous voyage of discovery to the East Indies, on July 8, 1497, is said to have offered up his humble supplications at the chapel attached to the hermitage, and again on returning, two years later, in September, 1499, to have rendered similar homage. This happened during the reign of Dom Manuel I. (1495—1521), surnamed the Fortunate, who determined to erect on the site of the hermitage a magnificent church in commemoration of the splendid achievements of the circumnavigator. This is the origin of the church of "Nossa Senhora de Restello," and the adjoining convent, in the vaults of which repose the remains of several kings of Portugal. The edifice, of the portal of which we give a view in this week's *Builder*, is a combination of the Ogive and "Plateresque" styles, and is one of the most elaborately adorned churches of Portugal. Its sculpture, both mural and statuary, is of the highest finish. The church contains a statue of its founder; a figure of the Virgin Mary, placed under a rich canopy; another of St. Michael the Archangel; and numerous saints in niches, also protected by canopies of filigree tracery.

There are comparatively few remains in Portugal of Mediæval architecture. The group at Belem, to some members of which we have before referred, is an important portion of them.

MEMORIAL CHURCH AT ST. PETERSBURG.

SIR,—We have received at the Royal Institute of British Architects, from the Foreign Office, by the courtesy of Earl Granville, a copy of the plan showing the site of the Memorial Church proposed to be erected at St. Petersburg to the memory of the late Emperor. As the Institute is now closed, and as the next number of our Journal of Proceedings will not appear until the middle of October, we shall esteem it a favour if you will publish a photo-lithograph of the plan, herewith enclosed, in an early number of the *Builder*. We venture to suggest that the conditions of this International competition, which were published by us on the 28th of July, should also be inserted, in order to explain the plan, especially as they have not yet been printed in your valuable journal.

J. MACVICAR ANDERSON, Hon. Sec.
WILLIAM H. WHITE, Secretary.

GEO. GODWIN, ESQ.

We willingly publish the plan as requested, and we append the conditions as translated:—

"Extract from the *Journal de St. Pétersbourg*, May 28 (June 9), 1881.

In pursuance of a resolution passed by the Municipal Council of St. Petersburg to erect a stone Church, dedicated to the Russian Orthodox Ritual, and to be sacred to the memory of H.M. the late Emperor Alexander II., a competition is opened for the design of this edifice under the following conditions, viz.:—

1. The design must be so arranged that the church has three altars, the spot where H.M. the late emperor fell mortally wounded (shown on the plan by a cross) may stand in the centre or at the right angle of the western part of the church. This spot may be considered and treated as constituting the object of an annexed part of the edifice, though it must, nevertheless, form one and the same connected design of the church as a whole.

*** The foundation line of the west elevation of the church must not advance into the bed of the canal to an extent exceeding 7 ft., as indicated by the line *a b* on the plan, but the steps of the *parvis* of the church may be placed upon the bridge.

2. The basement is not intended to be applied to any purpose other than to provide room for the heating and ventilating apparatus and the storage of fuel.

3. The church must be designed to hold a congregation of 1,000 persons, upon the principle of allowing 7 ft. square to every sixteen persons.*

4. The position of the tower or that part of the building which is to contain the bells is left to the choice of the competitors.

* The number of sixteen persons per square *sagène* (7 ft. by 7 ft.) is fixed, because the Russian Orthodox Ritual does not admit of the worshippers being accommodated with seats during Divine service.

5. Competitors are also required to submit designs for the ornamentation of the bridge, which is to cover part of the canal so as to form a square in front of the church and of the ornamentation of the part of the Palais Michel which will surround it.

6. The designs must include:—(*a.*) Detailed plan of the church, two elevations, one a lateral one, and the other facing the park, and also a section; these drawings to be prepared to a scale of 1 in. (English) to the sagène (7 ft.). (*b.*) The west elevation and another section must be drawn to a scale of 2 in. (English) to the sagène. (*c.*) A general plan, on a scale of 1 in. to 5 sagènes. (*d.*) A perspective view of the church with its approaches. (*e.*) An explanatory memorandum stating, amongst other details, the cubic capacity of the church, computed in sagènes, and describing the nature of the materials to be used in the construction.

*** Competitors may elaborate the details of the building as they may deem fit.

7. Russian and foreign artists are both eligible to take part in this competition.

8. The designs must be submitted at the office of the Municipal Council of St. Petersburg at the latest on the 31st of December, 1881 (12th of January, 1882), at noon.

*** The general plan of the site whereon the church is to be erected may be had on application, either to the *Gérant* of the Town-hall of St. Petersburg, or to the offices of the newspapers in which the present notice appears.

9. For four designs sent in by the appointed time, which fulfil the conditions laid down in the present programme, and are allowed by the jury to be the best in order of merit, the Municipal Council will grant four premiums. For the first in order of merit, 2,500 roubles; for the second, 2,000 roubles; for the third, 1,500 roubles; for the fourth, 1,000 roubles.

10. All designs must be sent in in a portfolio, and not rolled up in a case.

11. Every sheet of the drawings, as well as the explanatory memorandum, must bear a motto chosen by the author of the design. The names, rank, and address, of each competitor, must be supplied in a sealed letter, bearing the author's motto on the cover.

12. All the designs sent in will be exhibited to the public during eight days in the town-hall. After the decision of the jury the successful designs alone will be exhibited again in public.

13. The jury undertake to publish a short memorandum setting forth succinctly the merits and defects of all the designs presented. The names of the premiated competitors will be published in the journals in which the present notice now appears.

14. The prize designs will become the property of the Municipal Council of St. Petersburg. The designs not selected for the prizes will be returned, together with the respective letters unopened, upon presentation of the receipts originally given by the *Gérant* of the Town Hall.

15. Members of the jury are debarred from participation, direct or indirect, in the present competition.

16. The premiums awarded will not entitle the successful competitors to take part in the construction of the church. The committee appointed by the Town Council reserve to themselves the selection of the architect to be entrusted with the execution of the works.

17. The jury consist of the following Members of the Council of the Imperial Academy of Fine Arts, viz.:—Professors A. Résanow, D. Grimm, A. Krakau, and W. Schreiber; of the following Members of the St. Petersburg Society of Architects, viz.:—Professors R. Bernhardt and E. Gibert; and of the Mayor of the city, as well as of four delegates appointed by the Municipal Council."

References.

✠ The place where the Emperor was mortally wounded occurs at "1. arch. 4 *w.*" of the line of the quay.

a. B. Limit of the foundations of the church.

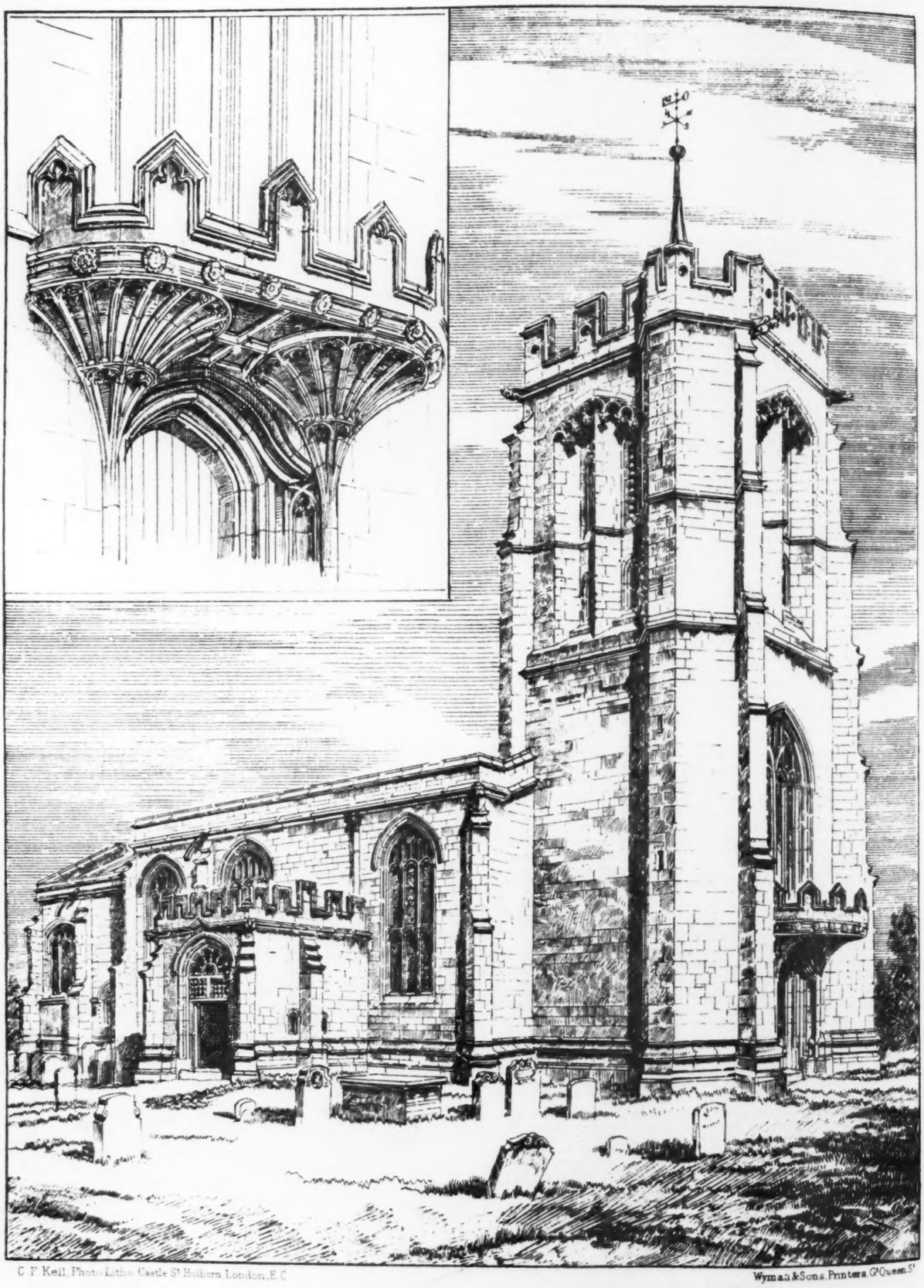
The lines *c d e f g h i*, or *c d' é f' g' h' i*, mark nearly the limits of the site intended for the church and the parts of the quay adjacent.

GAS AND WATER COMPANIES AND THE ROADS.

MR. JAS. LOVEGROVE, C.E., in his report to the Board of Works for the Hackney District as chief surveyor to the Board, says:—"The gas and water companies have made during the year, 1881, about 3,700 openings in the gravel and macadam foot and carriageways, and the total amount charged to them is 953*l.* 3*s.* 10*d.* The present system of breaking open the paths and roads for the purpose of cutting off water in cases of non-payment of water-rate, and after the lapse of a few weeks to re-open again for the purpose of laying on the water, is very unsatisfactory, and is one cause of constant disturbance of the highways. The system adopted by gas companies of cutting off inside the premises, clear of the highways, should be adopted also by the water companies. The highways are constantly being opened by the water companies because of the present objectionable system."

If some of the other Board surveyors will give similar statistics the damage done under the present system will become so apparent that a charge will be insisted on.

The Liverpool Autumn Exhibition of Pictures, now open, appears to be one of exceptional interest. Works by Briton Rivière, Sir John Gilbert, Yeames, Wells, Holman Hunt, and Alma-Tadema are included. A large picture by Mr. D. G. Rossetti, entitled "Dante's Dream," has been purchased out of the exhibition by the Corporation, and will be added to the local permanent collection.



C. F. Kell, Photo-Litho Castle St Holborn London, E.C.

Wyman & Sons, Printers, Gt Queen St.

ST. PETER'S, MAIDS MORTON, BUCKINGHAMSHIRE.—*Fifteenth Century.*

C.F.Kell, Photo-Lith. Castle St. Holborn E.C.

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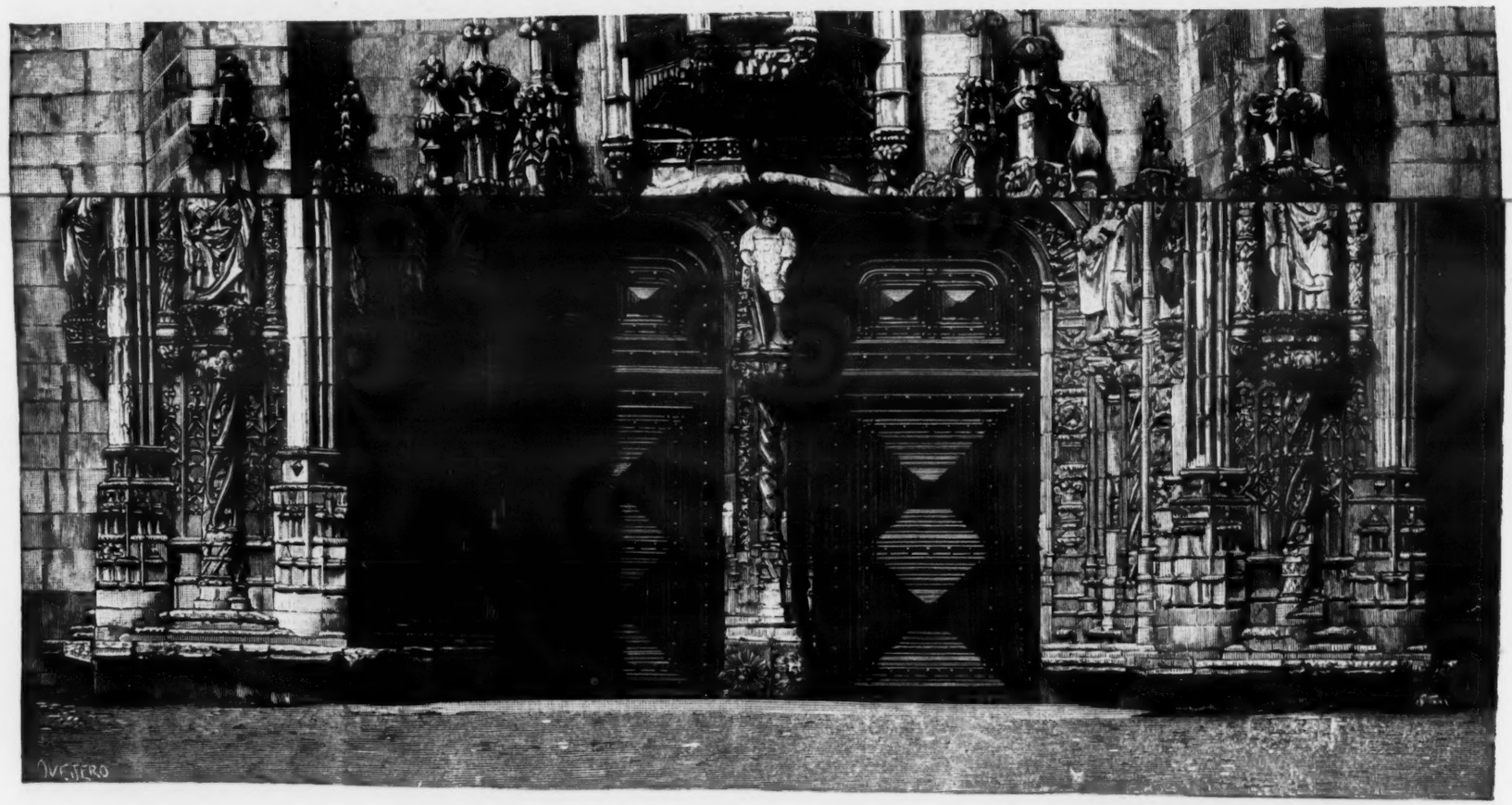
OUT-BUILDINGS, "THE LODGE," WALMER, KENT.



PORTAL OF THE CHURCH OF "SANTA MARIA," AT BELEM, NEAR LISBON, PORTUGAL.

PORTAL OF THE CHURCH OF "SANTA MARIA," AT BELEM, NEAR LISBON, PORTUGAL.

C.F.Kell, Photo-Lith. Castle St. Holborn E.C.

NEW STABLES, "THE LODGE," WALMER, KENT.—Mr. Jas. Neale, F.S.A., Architect.

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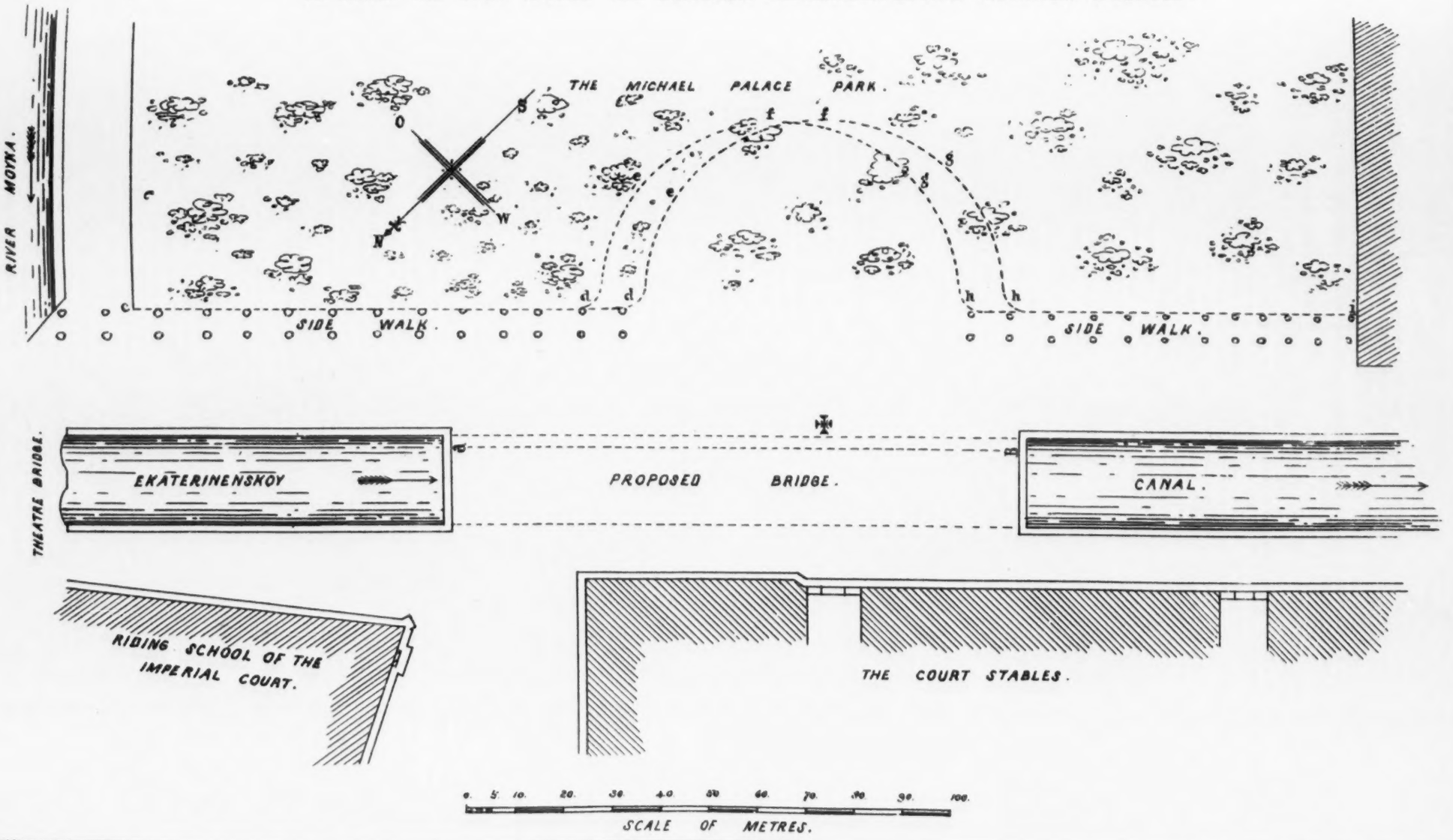
PLAN SHEWING THE POSITION OF THE SITE OF THE CHURCH PROPOSED TO BE ERECTED TO MARK THE SPOT WHERE THE EMPEROR ALEXANDER II WAS MORTALLY WOUNDED.



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NORTHERN ARCHITECTURAL ASSOCIATION.

LOCAL ANTIQUITIES.

THE annual meeting of this Association was held on the 6th inst., in the library of the old castle, Newcastle, the President (Mr. Septimus Oswald) in the chair.

The minutes of the last meeting were read by the hon. secretary (Mr. W. H. Dunn), and confirmed.

The President then read his address, in the course of which he said that the question of restoration or preservation of ancient buildings had more than a general interest to all in Newcastle, as the town possessed many such edifices, some of which it was projected to restore. There was the Black Gate, of which a good deal had been said lately, and the keep of the castle. The proposition to ask the Corporation to have the keep pointed with mortar or cement, under the direction of one of their engineering officials, filled him with alarm. How would they like to see the keep neatly pointed or covered with cement? No doubt decay of the stones was going on daily, but renewal of the most decayed portions from time to time would appear much the better course to pursue. In regard to the proposal to build a bridge from the roadway to the entrance of the Black Gate, he was doubtful, among other [things,]whether the safety of the entire building would not be endangered by the excavations necessary to such a course; but he made those suggestions with full deference to the opinion of those who had paid more special attention to the subject. He thought that anything done to the gateway should be more in the way of simple repairs than of what is called now-a-days "restoration," which too often meant the destruction of all remains of antiquity. Turning to another topic, he expressed the opinion that the appearance of our grand old churches and cathedrals was enhanced by the proximity of houses and other inferior buildings. The old houses seem to give a scale to a cathedral, and the gradual unfolding of the various parts of such a building added to its charm. It must be observed that he did not for a moment say that those petty structures should not be removed. Considerations of the picturesque were of little moment compared with sanitary and commercial improvement. He pointed out the new building at Amen Corner, which he was of opinion had the effect of "dwarfing" St. Nicholas's Church. He wondered whether those who passed the plans had ever considered its bearings on the "light and air" question as affecting the church, and thought public notice should be given of the intention to erect such buildings. The new churches in the North of England had very little of the picturesque about them. They all smacked of the T-square and drawing-board. In church and in street matters the rules of ecclesiastical commissions and local boards of health had a deadening effect on the imagination of the artist; but the additions and alteration of two or three centuries might render the churches more picturesque and historically interesting than they now are.

The Secretary said he had listened to the address with great pleasure. He had expected something to be said about building societies, but the President had been silent on that subject. As to the restoration of old buildings, that was a question on which they had different opinions; and he, therefore, should not express his opinion. But he must say that he thought the huge brick building which had been erected near St. Nicholas's Church, although a handsome building, out of place, character, and harmony with the ancient edifice. The corporation ought to give notice before they pass plans in which a building like St. Nicholas's Church is affected. The church had been handed down to us in trust, and we ought to be jealous of our old buildings and hand them down to posterity as a great trust. He moved that the best thanks of the meeting should be given to the President for his address, and for the way in which he had discharged his duties during his period of office.

The motion was seconded by Mr. H. D. Shewbrook, and carried unanimously.

The Secretary then read the annual report, which showed that the Society was in a satisfactory condition.

Mr. A. N. Dunn was elected president, Mr. S. Oswald vice-president, Mr. W. L. Newcombe treasurer, and Mr. W. H. Dunn, secretary.

CUMBERLAND AND WESTMORLAND ARCHÆOLOGICAL SOCIETY.

THE Cumberland and Westmorland Antiquarian and Archæological Society has just had its annual excursion, to which two days were devoted.

On the first day the party started in carriages from Egremont, under the guidance of Mr. Jackson, F.S.A., and proceeded by way of Calder Abbey, Gosforth, Seascale Hall, &c., back again to Egremont. At the head of Yeorton Brow, a halt of a minute or two was made, and Mr. Jackson pointed out a level field on the right-hand side as having been the site of Caernarvon Castle, described as "the original seat and still a possession of the family of Le Fleming." Nothing in the way of ruins, however, is to be seen. At Calder Abbey the party alighted, while the carriages drove back to Calderbridge, and a short paper descriptive of the abbey was read by the Rev. Canon Knowles. The ruins were then inspected, and Mr. Jackson and Canon Knowles made some remarks upon three mutilated stone effigies of mailed knights which lie against one of the walls; while Mr. Ferguson, F.S.A., Carlisle, directed attention to what is styled a cresset stone, a square block of red sandstone, having sixteen circular holes. These stones, several of which have been found about old abbeys, had long puzzled antiquaries; and Mr. Lees, of Wreay (a member of this society) claims the credit of discovering their use. It was the business of the cook in the monastery, it appears, to keep these holes filled with tallow or fat, into which a rush was set; and thus fitted up, the cresset stone was used to illuminate the dormitory. A walk along the romantic path by the Calder brought the party to St. Bridget's, Calderbridge, the attraction here being a curious portable or super altar, one of a number which had been blessed by the Archbishop of York about the middle of the fifteenth century, by permission of Pope Nicholas V. The altar, on which several small crosses are sculptured, was found at Calder Abbey, and the vicar of St. Bridget's, the Rev. A. G. Loftie, has had it secured in a frame in a corner of the chancel. The carriages were again put in requisition, and the party drove on to Gosforth Church. Here the curious old cross in the churchyard was inspected, and discussed. Canon Knowles thought the cross was of twelfth-century work, while Dr. Parker considered it much earlier, and narrated what local tradition said on the subject. This was to the effect that the cross had been erected by Danes who settled at Gosforth, and were converted to Christianity. Mr. Calverley thought that some of the figures on the stone indicated the binding to a rock with chains of Loki, the Scandinavian Beelzebub; and Canon Knowles agreed with Mr. Calverley that the carving was of a half secular and half religious character. The party next visited the church, and the Rev. Mr. Wordsworth, the rector, exhibited some quaint old communion-plate, some of it of pewter, and a black-letter copy of the Book of Homilies, folio, 1633. After some little delay, the carriages started again for Seascale Hall, the members gathering in a field adjoining the hall. Mr. Jackson pointed out that the field was surrounded on three sides by water, and was altogether exceedingly well adapted for a fortification; and as it must have been close to the Roman way to the various camps along the coast, he thought it not unlikely that it might have been the site of a camp. To test this supposition, Mr. Joseph Robinson, of Maryport, a member of the Council, and an enthusiastic explorer, had arrived at the field an hour or two before the party reached it, and with the permission of Mr. Walker, he had made a series of excavations on a small scale in various parts of the field; but his labours had met with no reward, no stoneware being discovered. Mr. Ferguson did not think it likely there ever was a camp here, as the field was commanded by rising ground, whence it could be rendered untenable by slings or arrows. The old church of St. Bridget was visited by some of the party, and on the return to Egremont in the evening the excursionists dined at the Globe. Subsequently the annual meeting was held, and papers were read by the Rev. W. S. Calverley on "Illustrations of Teutonic Mythology from Early Christian Monuments in Brigham and Dearham Parishes"; by Mr. Jackson on "The Mesne Manor of Thornflatt and its Owner, 1656-59"; and by Mr. Ferguson on "Church Plate in the Gosforth Deanery."

On the second day, after breakfast at Egremont, Mr. Ferguson read a paper, by Mr. G. T. Clark, F.S.A., on "The Mediæval Defences of the English Border." Mr. T. L. Banks, A.R.I.B.A., then read a paper on Egremont Church. The party afterwards proceeded by train to Ravenglass to inspect the excavations which, for some time, have been going on at Walls Castle, as the remains of a Roman villa, near Walls Farm (the property of Mr. Aaron Brown) are popularly called. Mr. Robinson has been lately excavating here, with most gratifying results, a hypocaust having been discovered, thus satisfactorily dispelling any little doubt that might remain as to the villa being indubitable Roman work. Walls Castle and the adjacent Roman camp were fully described in papers prepared by Mr. Jackson and Canon Knowles, and read at the Society's meeting at Wigton in September, 1876. Mr. Jackson referred to these papers, and described the nature of the excavations and the result of the discoveries made, and he warmly thanked the owner of the ruins, Mr. Brown, for having so kindly given them *carte blanche* to cut up the ground. Mr. Robinson and Mr. Ferguson also spoke, both gentlemen stating that the villa was unequalled by any remains of the kind either in England or France, there being no Roman villa elsewhere which stood over 12 ft. above the ground. Canon Knowles expressed a hope that the ivy with which the building was overgrown would be cut down, and it was stated that Mr. Brown intended to do this.

THE NEW NORTH DOCKS AT LIVERPOOL.

THE new North Docks at Liverpool, opened by the Prince and Princess of Wales on the 8th inst., as already mentioned, practically complete the great northern development of the Liverpool Docks, as authorised by the Act of 1873, which empowered the Dock Board to make an expenditure of 4,100,000*l*. The great northern basin, which, with its entrances, forms the most important feature of the work, has an area of about seven acres, and a depth of water at spring tide of 44 ft., while even at low water there are 12 ft. over the sill. The Alexandra Dock is not only the largest in Liverpool, but it has more quay and shed accommodation than any other in the world. The following is an official description of the new works:—

In 1873 the Mersey Docks and Harbour Board, the trustees appointed for the management of the docks at Liverpool and Birkenhead, having in view the necessity of providing additional dock accommodation to meet the increasing tonnage and size of the vessels trading to and from the port, instructed their engineer, Mr. George Fosbery Lyster, to prepare plans for carrying out that object, and these, after careful consideration by the dock authorities and the shipping as well as trading interest of the port, were approved, and the authority of Parliament obtained to borrow, on the security of the dock rates, the sum of 4,100,000*l*. for the purpose of carrying out the works. The works authorised to be constructed under the above powers consisted of extensive additions to the dock system at the north and south ends of the dock estate on the Liverpool or eastern shore of the river Mersey, and both sections have, during the last eight years, been pushed forward with all the speed that the varied nature of the operations involved in their construction would admit. The section of new docks opened by his Royal Highness the Prince of Wales are situated at the extreme north end of the city, a distance of three miles and a half from the Liverpool Exchange, and within the borough of Bootle. The entrance for shipping is through what is known as the Canada Basin, into which the tide of the Mersey ebbs and flows, and originally formed the vestibule of the most northerly approach to the then existing docks in this locality. This basin has been considerably enlarged and deepened, and its entrance widened from 250 ft. to 400 ft. On each side of its entrance piled timber jetties or piers projecting into the river are intended to be constructed, one being already completed, for facilitating the ingress and egress of shipping entering the docks at this point, as well as for assisting the sluicing operations for keeping the fairway and entrance clear of silty deposits. On the northern side of the basin are formed two docks or passages through which vessels enter the newly-constructed system, the first being the Langton Dock, having a water area of eighteen acres, with quay or berthing space

4,000 ft. in length. In connexion with and opening therefrom on its eastern margin are two graving-docks, each 951 ft. in length. These are so arranged that whenever required they can be subdivided into four docks, each capable of allowing the largest class of vessels to be overhauled or repaired. On the quay, between these graving-docks an important block of buildings has been erected, containing powerful engines and machinery, by Messrs. Hick, Hargreaves, & Co., of Bolton, for the purpose of pumping the graving-docks; also powerful engines for supplying the motive power for actuating the hydraulic machinery for opening and closing the dock-gates, bridges sluices, working cranes and other machinery throughout the system. The latter engines and the hydraulic appliances have been supplied by Messrs. Sir W. G. Armstrong & Co., of Newcastle-on-Tyne.

A number of dwellings have been erected on the "flat" system over this building for the accommodation of the foremen and enginemen. A lofty tower for the purpose of enclosing the accumulator has been built to a height of 120 ft. above the quay, also utilised as a clock-tower. The architecture of this group of buildings is Gothic in feeling,—somewhat freely treated to adapt it to a building of such an exceptional character. Northward of these graving-docks, and also leading out of the eastern side of the Langton Dock, is a branch dock having a water area of three acres, with 2,013 ft. of quay berthing space. Upon the south quay of this dock a hydraulic crane, capable of lifting 100 tons, is in course of construction for the purpose of dealing with heavy boilers and machinery. At the northern quay of the Langton Dock two passages are formed communicating with the dock, specially constructed to meet the requirements of the large and increasing size of steamers using the port, and named at the opening ceremony by her Royal Highness the Princess of Wales the "Alexandra Dock." This dock is 1,600 ft. in length from north to south, and has three branch docks, ranging from 1,100 ft. to 1,338 ft. in length, leading in shore from its eastern quay, and extending to within a short distance of Regent-road, the main thoroughfare flanking the dock at this point. This dock, with its branches, has a water area of 44½ acres, and 11,814 ft. in length of ships' berthing space. To the northward of the Alexandra Dock another dock is in course of construction, having a water area of sixteen acres and 4,000 ft. of quay berth. The quays surrounding these docks are provided with capacious and substantial lock-up sheds of from 80 ft. to 95 ft. in width, for the protection of cargo, and are in direct communication by road with the city, and by rail with the stations of the Lancashire and Yorkshire, the London and North-Western, the Midland, the Manchester, Sheffield, and Lincolnshire, and the Great Northern Railway Companies.

A most important feature in the design of these docks is that of laying the sills of the entrances at the level of 12 ft. below the old dock sill datum, thus giving a depth of water on an average neap tide of 23 ft. 7 in., and on an average spring tide of 30 ft. 10 in., and enabling the general class of vessels using the port to enter or leave the docks at all tides throughout the year, without the delay, expense, and risk of loading and discharging a part of their cargo in the river on low neaps, as has been the case hitherto. On the east side of the main entrance by which vessels enter this new group of docks, a large block of buildings is in course of erection, containing residences for the dockmaster, piermasters, and gatemen; also offices for the administrative staff. The general appearance of these erections is that of a solid block, the yards and drying-ground being arranged in a quadrangle approached by a covered archway. The architecture is a free adaptation of Domestic Gothic, red brick being used instead of stone to obtain the necessary relief. The dock walls are of a most substantial character, and are for the most part built of cement concrete, faced with the red sandstone of the district, the coping being of granite. The entrance walls are faced with granite. The graving-docks, with the exception of the steps and slips, which are granite, are built throughout of concrete. The whole of the dock-gates are constructed of greenheart timber, this being considered by the engineer as the most durable description of timber for this class of work. The additional accommodation for the trade of the port provided by the docks just opened by his Royal Highness, and those at the south end in course of construction, will amount to about 110 acres of water area, with over 6½ miles of quay berth.

It may be added that in carrying out this great work, Mr. Lyster has been assisted by Mr. Fielden Sutcliffe, assistant dock engineer, and latterly by Mr. Lyster, jun. The contractor for the excavations in connexion with these works was Mr. Chas. Tottenham. It is satisfactory to be able to add that the new works have so far been executed without any serious mishap or casualty.

THE LONDON AND ST. KATHARINE DOCKS.

SOME interesting statements were made at the half-yearly meeting of the London and St. Katharine Docks Company, which has just been held. The company may be said to be one of the largest corporations in London, its capital being about 10,000,000*l*. The company's revenue for the six months ending in June last was 555,446*l*. The expenses, however, were unusually heavy, amounting to no less than 409,179*l*., leaving a profit of 146,266*l*., of which 73,021*l*. was absorbed in interest charges, including 12,131*l*. on account of the Victoria Dock Extension. The dividend declared was at the rate of 2½ per cent. per annum only. Adverting to the large outlay which had been incurred in the Victoria Dock Extension, the chairman observed that to his mind the most satisfactory feature was that with regard to what was likely to be the future course of the commerce of the country they had adopted those means which would most likely be beneficial to the company. He remarked that steam and telegraphy had exercised such an influence that it was no longer necessary to hold in our ports those stocks of goods which were formerly held. They had imported something like 40,000 tons more goods than in the corresponding period of last year, in spite of which their stock of goods at the close of the half-year was about 4,000 tons less, and notwithstanding the larger quantity of import goods landed there had been an improvement in the receipts on that head, of only 8,000*l*. When, however, they came to the consideration that in future the trade of this country was more likely to be a transit trade, they would see that in every item which was likely to be important in the future they had had a very substantial increase. Their export rates showed an increase of over 8,000*l*., their tonnage rates on shipping an increase of over 10,000*l*., and their rates for discharging cargo an increase of 9,000*l*. Grain was likely to be one of the largest trades of this country in the future, and whereas in 1880, out of 496,000 quarters in the port, the company had only had 14,000 quarters at the end of the last half-year, out of 175,000 quarters no fewer than 76,500 quarters had been in their docks. Another feature of promise was that they had made an agreement which would bring a large coal traffic into their docks, particularly into their Royal Albert Dock.

THE NEW GRAMMAR SCHOOL AT CARLISLE.

ON the 6th inst. the foundation-stone of the new grammar school, which is to be built at the corner of Spring Gardens and Swifts-lane, Carlisle, in accordance with the provisions of the scheme of the Charity Commissioners, was laid by his Grace the Duke of Devonshire, K.G. The Governors having secured the site, at a cost of 3,250*l*. (towards which the Duke of Devonshire contributed 500*l*.), invited eight firms of architects to send in plans, and five responded to the invitation. Finally, the first premium was awarded to Mr. G. D. Oliver (of the firm of Messrs. Hetherington & Oliver, of Carlisle), Mr. E. R. Robson, of London, being second, and the successful competitor was instructed to prepare specifications and detailed drawings. Last month tenders were invited, and the successful contractors were Messrs. Beaty Bros., Carlisle, 4,591*l*., for the builder's work, and Messrs. H. & R. Court, Carlisle, 2,746*l*., for the joiner's work, making a total of 7,337*l*. To this must be added the cost of painting, slating, and furnishing, and it is thought that the total cost will be at least 10,500*l*.

The main building will (according to the *Carlisle Journal*) be in what is called the Domestic Tudor style of architecture, the materials used for facing the external front walls being red sandstone, the quoins and dressings being "skew chiselled." The main buildings will have a south-east aspect, facing Swifts-lane, and set back 70 ft. from the line of the road, so as to leave a good carriage drive in front. The western elevation is set back several feet from the Spring Gardens-lane. On approaching the new school from Albert-street, the most striking feature in the building will be the central tower, in which the main entrance will be placed, with an oriel window above the porch, and a conical roof. On the right of the central tower, on the ground-floor, are the assistant master's sitting-room, the dining-hall (36 ft. long by 18 ft. 6 in. wide and 14 ft. 6 in. high), with a large bay-window, capable of seating sixty to seventy boys; and further eastward stands the head master's house, with accommodation for about thirty boarders. On the left side of the central tower, on the ground-floor, are the Governors' board-room and a series of class-rooms, which extend northwards in what may be called an annexe of the main building, connecting it with the large schoolroom or prayer-hall, which will apparently occupy the position now taken up by the farm buildings at the corner of Spring Gardens-lane. This hall, which can either be approached by the main corridor which runs from the central tower past the doors of all the class-rooms, or by a covered way leading from the playground and the boarding-house, will be 87 ft. long by 28 ft. 6 in. wide, and runs east and west, with a large window at each end. It will seat about 300. At the south-west corner of the building a chemical laboratory is provided for. The entrance for day scholars will be in the west front, about midway between this laboratory and the large schoolroom or prayer-hall. In arranging the class-rooms special consideration has been given to the purposes for which they were intended; the drawing-class room, for example, being provided with suitable roof-lights.

THE NEW MARINE OBSERVATORY OF HAMBURG.

IN the year 1874, a central institution was established at Hamburg for marine meteorology and storm-signalling for the entire German Empire. The want, then and since felt, of a building specially designed for the scientific purposes in question, has now been met. A structure has been erected, which is described in the German press as not only expressly designed for the purpose required, but as also being an ornament to the city from an architectural point of view.

The site was a gift on the part of the senate and municipality of Hamburg. In the latter part of 1878, Messrs. Kirchenpauer & Philippi (architects of the chronometer-testing house) were entrusted with the preparation of designs for the work, and their plans and estimates were finally approved on July 30th, 1879. Various preparatory works (necessary for securing a ready access to the site) having been carried out, the tenders of August Maas as general contractor for earthwork, bricklaying, asphalte work, &c., was accepted, as also that of the Hanseatic Building Company for stone work; both contracts having been signed on October 3rd, 1879.

During the first half of the year 1880 the work progressed rapidly, and the building was roofed. For the laying-out of the gardens, &c., H. Ohlendorff contracted, and by June, 1880, the magnetic pavilion or compass-observatory was ready for use. The ceremonial of laying the foundation-stone took place on June 15, the stone being placed in a space reserved for it in the entrance.

The internal work has been since carried on with activity, and the opening by the Emperor in person was announced to take place on the 14th inst.

A New Substitute for Timber.—It is reported from America that Mr. S. W. Hamilton, of Lawrence, Kansas, has invented a process for producing what the Americans call "lumber," from straw, by a process which is kept secret. It can be made to any required length, and up to 32 in. wide, will hold nails as well as wood, is water-proof, and takes a high polish. It is about the colour of oak, with a specific gravity of one-fifth more than that of well-seasoned black walnut.

THE ROYAL COURT THEATRE, LIVERPOOL.

THIS new theatre, which stands upon the site of the old Amphitheatre, was opened on Saturday, the 10th inst. The rebuilding has been carried out from plans and drawings by Mr. Henry Sumners, F.R.I.B.A., of Liverpool, and under his supervision. Mr. Sumners found it necessary to sacrifice the whole of the interior of the old theatre, and consequently the gallery, circle, boxes, and stage had to be totally demolished and swept out of the place, leaving nothing but the four bare walls. It was found in clearing away the old timbers for the purpose of remodelling the theatre that there was not a faulty piece of wood in the whole of the place. The T beams spanning the wide building are as good as when first put in their places,—more than half a century ago,—the queen-posts being of African oak. The brick walls showed, in every instance where they had to be cut, that the old Liverpool hand-made bricks have never been excelled. The mortar, too, looked more like mountain limestone than the compound used nowadays. On the 1st of March last, Mr. Sumners entered upon the scene with a body of workmen, who began the work of demolishing the old building with great energy. The rebuilding, decorating, furnishing, and fitting up has proceeded with the same celerity, and in the short space of six months the building stands complete. The stage and all its complicated mechanism has been constructed by Mr. John Byrne. The rock under the stage has been taken out to a depth of 27 ft. This renders it possible to lower scenes through spaces in the stage with great rapidity. Moreover, what is technically called the "gridiron," upon which the blocks and drum winches are fixed, is now about 72 ft. above the stage. The facilities thus gained for raising part of the scenery and sending the remainder down into the sinking in the rock enable the stage to be cleared of all the scenery used in any piece in a very few seconds. The whole of the apparatus for lighting the stage and the other working parts of the theatre has been constructed by Mr. Watmough. The gas-meters are inclosed in brick chambers distinctly set apart from the stage and entirely clear from and not under any part of the auditorium. An ample main for the supply of water for scenic and other purposes has been laid on to the stage and other parts of the house by the city authorities. The auditorium is narrower by 10 ft. than it was before the rebuilding took place, being now between 60 ft. and 70 ft. But the distance from the footlights to the wall at the back of the stage is greater than before, the proscenium wall having been brought forward. Notwithstanding this, owing to the removal of some useless rooms at the Great Charlotte-street end, the auditorium is as large as before. The house will, it is thought, accommodate about 3,000 people. All the entrances are ample in width and easy of access,—that to the boxes, dress circle, and stall is from Queen's-square, and is approached by two folding doors, which are each 6 ft. wide. These doors lead into an entrance-hall about 21 ft. in width, the floor of which is inlaid with Burke's mosaic work. Iron is freely used in the construction of the galleries. The pit is entered, on a level from Great Charlotte-street, by a short passage of 7 ft. in width. The pit floor is raised at the back, and has an incline to the stage of 1 ft. in every 18 ft. The pit seats are of pitch pine, highly polished. The entrance to the gallery is also from Great Charlotte-street, up a well-lighted and capacious stone staircase. It has been the study of the architect to avoid putting a single seat in the theatre, from which the spectator cannot command a good view of the stage. The ceiling, proscenium, and front of the boxes, and also the fronts of the dress-circle and gallery, have been covered with Goodall's fibrous plaster, the materials of which is light, and can be moulded into the most elegant forms. The curtain is of crimson velvet, bearing the royal arms, woven in gold. The act drop, which is the work of Mr. T. P. Hall, of Manchester, represents Thespis reading his play to an assemblage of villagers. On the Queen-square front of the building there are five heads carved upon five medallions of Stourton stone. The middle one is Shakspeare, and he is supported on either side by two busts, one emblematical of tragedy the other of comedy. A bust of Mozart is at the west corner of the front, and of Handel at the east. The carving has been done by Messrs. Norbury, Upton, & Patterson, of Liverpool. Dressing-rooms are numerous and conveniently situated; they are supplied with hot and cold water throughout. The oxyhydrogen gas-holders, for producing limelight effects are the work of Mr. Henry Whitehead, Gaythorn, Manchester. The stage is separated from the auditorium by a brick wall running up to the roof of the building, and the auditorium is again separated in a similar manner from that part of the building containing the entrances and crush-room.

Subjoined are the dimensions of the house:—

	ft.	in.
From curtain line to dress-circle front	40	3
From curtain line to gallery front	42	0
From curtain line to wall at back of pit	70	8
From curtain line to back of stage	50	0
Width of stage	62	0
Height of stage to gridiron	50	0
Depth of stage to mezzanine floor	6	0
Depth of stage to well of stage	27	0
Height of ceiling from pit floor	40	0
Height from pit floor to dress-circle tier	13	2
Height from dress-circle tier to gallery tier	25	7
Height and width of proscenium opening, 28 ft. by 28 ft.		

The brick and rock work has been done by Messrs. Roberts & Robinson, of Liverpool; the woodwork by Mr. Thomas Urmson, of Liverpool; the slating and plastering by Messrs. Johnson & Son, Liverpool; and the ornamentation by Mr. Goodall, Liverpool.

THE "INNER CIRCLE" RAILWAY COMPLETION.

ON the 5th inst. the Lord Mayor of London "cut the first sod" of the works necessary for the completion of the "Inner Circle" of railways. The circle is incomplete by reason of the break between Aldgate and the Mansion House. The subject of the completion of this railway has, as is well known, been the source of much discussion and litigation, but it has at last been settled, chiefly by the advance in the contributions to be made by the public and City authorities to the Metropolitan and District Railway Companies. The Commissioners of Sewers at first offered to give 250,000*l.* towards the project, but finally consented to give 300,000*l.*, which, with the 500,000*l.* promised by the Metropolitan Board of Works, makes the subvention of 800,000*l.*, which will come out of the public pocket to assist the railways in their scheme. The result of carrying out this work of completion will be very advantageous to the public, as the underground communication between the different parts of London will not only be improved, but also the thoroughfares under which it will burrow. The cost of the public improvements to be effected along the line of route is estimated at 1,200,000*l.*, so that the companies will pay 400,000*l.* for their right of way, and 800,000*l.* for the widening of old streets and making of a new one. By this means a fine line of thoroughfare will be established from the Houses of Parliament to the Tower by way of the Embankment, Queen Victoria-street, Cannon-street, Eastcheap, and Tower-street. Starting from the Mansion House, the new line will be in a tunnel under the eastern portion of Cannon-street, going past the King William Statue and under Eastcheap, the houses for that purpose being pulled down, so as to gain a total width of 60 ft. The line will then pass on by way of Little and Great Tower streets as far as Mark-lane. At this point a new street will commence, passing round by a curve on the north side of Allhallows Church, and terminating in Trinity-square. The railway will, however, continue its underground course, curving round in a northerly direction so as to cross the Minories and run at the back of that thoroughfare up to Aldgate. Mr. Walker is the contractor, and it is anticipated by Sir Edward Watkin that the work will be completed in about eighteen months.

RAMSGATE.

THE Smack Boys' Home, lately erected in the Royal Harbour, Ramsgate, from the designs of Mr. Alfred B. Pite, of Bloomsbury-square, was opened last week by the Marchioness of Conyngham. The work has been carried out by Mr. W. Martin, contractor, of Ramsgate, at a cost of 2,000*l.* The accommodation provides for sixty boys, having, on the ground-floor, spacious messroom and offices; and on the upper floors, dormitories with double berths, work-room, washhouse, laundry, and locker-room. The institution, it is anticipated, will be self-supporting; but the present building has been erected by voluntary subscriptions.

USES OF FAURE'S ACCUMULATOR IN ELECTRIC LIGHTING.

AT a meeting of the Mathematical and Physical Science Section of the British Association, Sir W. Thomson read a paper on this subject. He observed that the first and most obvious use of Faure's accumulator was to produce the electric energy at a most convenient time, and keep it in store until it could be most conveniently used. It was obvious that great economy and important practical results were to be obtained by the use of such a system, provided the expense of the storing material, and the magnitude and bulkiness of the apparatus that it involved were not prohibitory,—were not such as to run away with whatever gain there might be in the principle. The subject was altogether in its infancy, and we must wait for greater information, both as to its practical and economic side. So far as estimating electric quantities was concerned, we must hold our hands until incandescent lamps were given us, with a statement that they would burn at so many candles power, approximately, when so many volts were applied to them, and for such and such a time. One use of the Faure accumulator, which was obviously of great value, was that of connecting the working machine with the dynamo-machine, in order to fulfil the first condition of giving greater regularity than could be attained, or was practically attained, without it; and, in the second place, of being ready to sustain the light for several hours after the driving machine was stopped.

Dr. C. W. Siemens said, if Faure's battery could be used as a store to be resorted to at any moment by means of an automatic arrangement, there could be no doubt that very valuable assistance would be given to the practical electrician in carrying out almost every application of electricity, not only to lighting, but to the transmission of the power. The only danger was that, if the sources of power failed, there was an interruption, and the effect of these interruptions was very trying, in the case of lighting especially. The arrangement shown by Sir Wm. Thomson seemed very efficacious and valuable.

Mr. Swan, of Newcastle, the inventor of the incandescent light, expressed satisfaction with the paper of Sir Wm. Thomson. He thought, however, there was some difficulty in the way of adopting his system. Under existing arrangements the accidental throwing off of a belt extinguished the lights when the dynamo-electric machine was exclusively depended upon for producing the current. It seemed that the addition of Faure's battery to this method of supply (especially when used as Sir Wm. Thomson proposed to use it, viz., as a store and a regulator, with the addition of his automatic circuit opener) was the very thing wanted to make electric lighting all that was needed. He had recently experimented as to the use of the Faure battery in connexion with his own lamps, and he found it to work admirably. He could not express the delight he felt in the prospect that lay before them of using the battery in connexion with our other means of producing electric currents.

RUINING STONEHENGE.

WE can scarcely believe what we hear from Stonehenge. According to the *Salisbury Journal*, "the only remaining outer trilithon on the north-eastern side of the rings has been bolstered up by means of a gallows-like wooden erection, very similar in construction to that which supported Temple Bar during the last months of its existence. This is placed transversely beneath the upper stone; and, as it is of a very substantial nature, it completely destroys the picturesque effect of that side of the ruin. The trilithon in question seems to us to be quite as erect and safe as any of the stones, and probably more so than the majority of them; and we cannot conceive why it should have been chosen as a *corpus vile* for the 'restorers' to begin their experiments upon. The huge pillar which inclines inwards on the south-western side will, presumably, be next taken in hand, for, since the work has been commenced, it is but natural to suppose that it will be completed, and that all the stones will ere long be safely buttressed by a number of unsightly props and scaffoldings." This unnecessary disfigurement of a national monument of extreme value and interest should at once be protested against by all who have any influence likely to weigh against its perpetration. Who is responsible for it? It seems almost like a piece of spite in reply to those antiquaries who

have recently been urging the necessity of setting upright some few of the stones that are obviously slipping. No individual should have it in his power to damage such a monument as Stonehenge, even under the guise of protecting.

VERGERS AND CATHEDRALS.

SIR,—In your number of the 13th ult., under the heading "A few Modest Suggestions," for the approaching meeting of the British Association at York, your correspondent, "F.S.A.", suggests *inter alia* an intercession with the Dean to allow the cathedral to be seen without the intervention of an "illiterate verger," and he follows with an account of an infliction he underwent from one of those custodians whom it seems to be the peculiar province of Deans and Chapters to appoint. It is devoutly to be hoped that the authorities, acting on this seasonable suggestion, mercifully spared the members of the Association who were gathered together in that grand old city a repetition of the infliction to which "F.S.A." refers, and have permitted the Minster to be seen without the irritating accompaniment of a string of mild jokes.

When will Deans and Chapters recognise the fact that they are only the trustees of these glorious buildings, reared by our pious forefathers to the glory of God, and handed down to us as a precious possession, to be held and preserved with loving care, for generations yet to come? Let us for a moment consider the feelings of one of our educated Transatlantic cousins, who, on visiting the "old country," as some still affectionately term it, enter for the first time one of these grand temples and experience the (to them) new sensation of its strange and weird magnificence bursting on their view with all its grand effects of light, form, and colour, and then, sir, like a spider from his web watching a fly, pounce comes the aforesaid custodian, and with what "F.S.A." calls his "miserable twaddle," leads them like a flock of sheep the accustomed round. What, indeed, can the enlightened foreigner think of us? I, too, have just undergone a similar infliction, when, a few days since, I visited one of the finest of our cathedrals,—the only example, I believe, conceived, planned, and carried to completion in one style of architecture. Would that I and my friends had been left alone to the quiet enjoyment of the feast; but no, the moment the choir-gates were entered down comes the verger, "This way, please, I am just going round; that's the organ divided into two parts, the pedal pipes and the 'bellus' is in the transept"; and thus through the show like the keeper at a menagerie. "That's a wonderful brass; notice the hares and rabbits; that screen was removed from another part of the cathedral; they employed an 'architec' at the end of the last century: he did everything all wrong, and they have been undoing everything he did. That's a cope-chest; they used to wear copes of velvet, embroidered with gold, and that's where they were kept. Notice the 'cullums,' they are all of Purbeck marble; they can't get any of this size now. That's a splendid monument; it cost 600*l.* to restore; you see the figure of the lady is placed over her husband, because she was higher in rank." But the climax was reached in the chapter-house when beginning the description of the quaint sculptured groups at the creation, we were told, "That's Eve, with the apple in her hand, a-giving it to her husband. That's Joseph, being put in the pit, head downward." But, enough of this. The description was continued in a kind of nasal chant until the door was again reached. "You will find it all in the Guide-book, price one shilling." I was taken to a table, and told to enter my name in the book, and to put 6d. in the bag for each of the party. To this fee I make no demur. Few would object to contribute towards the maintenance of this glorious pile. I must, moreover, acknowledge the politeness and attention of our guide; on this ground no complaint could be made. I asked to see the library, but was told that the key was kept by the librarian, and that it was only shown on certain days. Why only on certain days? Is it too much to expect that every part should be open without restriction?

In conclusion, may I venture on a suggestion that the Dean or some one of the cathedral dignitaries should disguise himself, and, like the "Amateur Casual," undergo the infliction in person? But, if this be declined as quite too painful, send a shorthand writer, and let him take down *verbatim et literatim* this miserable stuff, from which the unfortunate visitor is unable to escape. Lay this before the Chapter at their next meeting, when, if they will be at the trouble to read it, perhaps it might be "reformed altogether," and at my next visit I may find some more intelligent guide, or, failing this, be permitted to wander in contemplation and peace.

C. T. H.

SIR,—I was surprised to see the letter by "F.S.A.," complaining of want of attention, &c., at York Minster. Permit me to say that three months ago I was shown over by one I thought a model of politeness and intelligence. My visit was a long one. I made several notes, and spent an hour in the crypt,—in fact, gave an unfair amount of trouble, I thought, for a stranger. I should like some of your readers, particularly "F.S.A.," to visit the Abbey at St. Denis, and experience what rudeness really is. I do not think they will find it in any abbey in England,—certainly not at York Minster.

SYDNEY SMIRKE.

*** This may be quite correct, doubtless is so, but it does not at all affect the correctness of "F.S.A.'s" complaint, which has since been confirmed by other correspondents. "F.S.A." said nothing of "rudeness," he simply objected to the illiterate twaddle that was talked.

THE BRITISH ASSOCIATION AT YORK, SEPTEMBER, 1881.

"A Picture in Little."

A's the Association of far-spreading fame,
B stands for British, who gave it its name.
C's Correspondence enormously great;
D's for the Dinners the visitors ate.
E's for the Engines which didn't explode;
F is the Fun travellers had on the road.
G stands for Gossip, so tripping and light
H Howard Castle, sightseers' delight.
I Indian presents by our Prince sent down,
J for the Jubilee held in the town.
K for the Kindness evinced everywhere
L Local secretaries with patience rare.
M for the Minster, so stately and grand
N for the Noodles who won't understand.
O is the Ouse, which enriches the town;
P is the President, of wide renown.
Q stands for Queries, excuse for much talk;
R for the Railway which took folks to York.
S is for Science, the real *raison d'être*,
T for Tea-table talk, and *tête-à-tête*.
U's for the Units too late for each outing;
V is the Voice which grew hoarse with much shouting.
W is for Whitby, renown'd for its jet;
X the policeman whom nothing could fret.
Y is for York and its int'resting "questions,"
Z is for Zoology, one of the "sections."

R. F. H.

THE ANCIENT LAND LAWS OF INDIA.

SIR,—Students of Sanscrit are unanimous that the ancient land laws of India are the oldest established on the globe. The royatwar, or individual settlement, by which the royatwar, or cultivator, pays rent for the farms he himself cultivates, and should they prove unproductive owing to a dry season he is entitled to an abatement, is a judicious mode by which the industrious are not made to support in indolence an idle portion of the community. A permanent royatwar is a fixed sum paid in all seasons for the farms the cultivator occupies. The landlord, accompanied by the taseldars, makes a personal inspection of the uncut crops, which enables him to judge where remissions should be afforded. That the Irish members, with all their eloquence and capacity for obstruction, should have omitted an uncut clause in the Irish Land Bill completely overwhelms me. It will be a good day for England when the students at Oxford, Cambridge, and the boys of St. Stephen's will learn more Sanscrit and less Greek.

PIERSE ARTHUR.

CEMENT AND VEGETATION.

SIR,—I am about to plaster with Portland cement a house in Devon, surrounded by trees, many of which are close to it. I wish to throw sand against the cement before it has set, to give it colour and a rough appearance, but I am advised to finish off the cement smooth, lest the sand should promote the growth of vegetation in this damp climate. Others tell me that nothing ever grows on Portland cement.

The house stands on the top of a hill, above all damp from valleys, and in a dry situation apart from trees. My desire is to use the sand for the sake of appearance, but I shall be glad to hear what others say.

DEVON.

DEVELOPMENT OF THE COLOUR SENSE.

SIR,—The discussion upon this subject at the meeting of the British Association, I must confess, somewhat surprised me. The general conclusions of modern science are sometimes lost sight of in special studies. Thus colour in the paper referred to is regarded as an entity external to sense, which the eye either spontaneously perceives, or has to be developed to perceive; whereas, according to the received theory, colour, as colour, has no existence whatever, save and except as a mechanical vibration. Colour is a condition of the optic sense, co-eval in all probability with the existence of an eye. We might as reasonably talk of the development of the sense of heat. From one simple point of view, indeed, namely, in the sensitiveness of nervous organisation to appreciate delicate variations in the modes of force, there may have probably been progressive development. The characteristics of what we term "culture," "refinement," are indications of a change towards higher nerve sensitiveness. Fondness for violent contrasts in sensation belongs to the barbaric state. There are eyes in animate being which possibly exceed the human in sensitiveness. Nerve development has probably a human limit, beyond which it can no farther go. To this goal is progression, and from it decadence. It would appear as if human nature itself, as all cosmical phenomena, were amenable to the eternal tidal action of ebb and flow.

METER.

SMOKY CHIMNEYS.

SIR,—In reply to a last week's correspondent, I beg to tell your readers that they may cure a great many smoky chimneys by the use of fine wire gauze in front of the fire-place, and that the success depends entirely on the gauze curtain approaching very nearly to the character of a "blower." The finer the mesh and the nearer the gauze-curtain is brought to the fire-bars, the more violent is the draught you get; but though in some or many cases a smoky chimney may be cured, a certain price has to be inexorably demanded for it and paid. The air which has passed away must and will be replaced. If it cannot be replaced by pure air, it will be replaced by foul.

REDE. EDWARDS, JUN

Sir,—In lieu of a sheet iron blower, use fine wire gauge (that used for meat-safes), iron or brass, to suit the room, strained over an iron wire frame, and suspend by pins from the centre of the grate. The writer has used blowers of this description for the past thirty years, and there is nothing better. I think the *Builder* gave me the idea.

EDW. CORFIELD.

A VIKING SHIP.

SIR,—Allow me to thank you for the excellent *resumé* you give, in your number of September 10th, of the paper I read before the British Association on the Viking ship. I trust it proves of interest to your readers. Though generally most correct, there are one or two errors, doubtless stenographic in origin, which I should not like perpetuated, and, therefore, may I ask you to kindly insert these lines?

Bow and stern are similar in shape and are *pointed*, not *painted*. This is an important fact, because the shields show signs of paint, but the timbers of the boat none. Then again, "In the Frithiof Saga, however, the 'ball of copper' was spoken of." This should of course be "keel of copper." Also "Starboard was a corruption of the word 'sturboard,' which, no doubt, owed its origin to the ancient position of the rudder, as in this galley." *Starboard* should be *steerboard*. The vessel was excavated at Gokstad.

The sepulchral chamber was tent-like in shape, made of logs placed side by side, leaning and meeting on a ridge-pole running parallel with the main axis of the ship. There is nothing about "the side running." The treaty made, at the end of the Vikings' descents on Scotland, was between Malcolm and King Sweno of Denmark.

J. HARRIS STONE, M.A.

TREATMENT OF CANDIDATES.

MIDDLESBROUGH AND STOCKTON BOARD.

AT the last ordinary meeting the Board proceeded to appoint a general manager for the waterworks, at a salary of 500*l.* a year. One hundred and nineteen applications had been received in reply to the Board's advertisement, many of the applicants having had extended experience in connexion with waterworks. Alderman Williams proposed Mr. D. D. Wilson, of Middlesbrough, a recently retired member of the Water Board, Mr. W. Jones seconding.

Mr. John Dunning proposed that the Board should choose out of the list of applicants three or four for consideration. He trusted they were not going to make a farce of the business in getting gentlemen to send in applications for the vacancy, if the applications were not entertained. Mr. D. D. Wilson had criticised the expenditure of the Board, but the members would now be able to see what he aimed at.

Mr. Knowles (Stockton) seconded the amendment, saying he would be no party to a foregone conclusion.

Mr. Smith (Mayor of Stockton) thought they were acting dishonestly in the case of the gentlemen who had applied; some had even said that the appointment had been arranged beforehand.

Eventually, upon voting, Mr. D. D. Wilson was appointed by seven votes to two.

It was arranged to meet in a fortnight to draw up an agreement with Mr. Wilson.

IZAAK WALTON'S HOUSE.

THE block of houses between Bell-yard and Chancery-lane, facing Fleet-street, will shortly be demolished in order to widen the roadway in front. It is claimed that one of these houses was once the residence of the author of "The Compleat Angler, or Contemplative Man's Recreation." Peter Cunningham, in his "Handbook for London," vol. i., writes,—"Isaac Walton's house was about the seventh on the left-hand side as you walk from Fleet-street into Holborn. He lived here from 1627 to 1644." Thornbury, in "Old and New London," is more precise as regards the locality:—"Izaak Walton, that amiable old angler, lived for some years (1627 to 1644) of his happy and contented life in a house (No. 120) on the west side of Chancery-lane (Fleet-street end)." Certain it is that, at two periods during his residence in London, Walton occupied a house in Fleet-street. A deed, bearing date 1624, in which year Walton was married, expressly describes Walton's abode to have been "on the north side of Fleet-street, in a house two doors west of the end of Chancery-lane, and abutting on a messuage known by the sign of the Harrow. The second period at which Walton was a resident in Fleet-street is shown by the parish register of St. Dunstan, Fleet-street,—"1633-4—March 21. Henry, son of Isaac Walton, was baptized, out of Fleet-street." The same register shows that in the previous year Walton resided in Chancery-lane:—"1632. —October 17. Henry, sonne of Izaak Walton, was buried, out of Chancery-lane." These entries refer, of course, to two different children, both of whom died in early infancy. It is well to preserve, as far as improvement will permit, any visible record that will recall "meek Walton's heavenly memory," as Wordsworth sings; but none such exist in Chancery-lane or Fleet-street. Walton's residence in the latter was pulled down in May, 1799, to widen the entrance in Chancery-lane, in which no vestige of what might have been the residence of the hosier-angler now exists,—even its position is a matter of doubt. Had either of the above houses existed in 1805-7 it would certainly have been noticed by "An Architect" who, during these years, contributed a long series of elaborate papers to the *Gentleman's Magazine* on the old houses of London, more especially those in Fleet-street and its neighbourhood.

STRATFORD-ON-AVON CHURCH.

THE LATE MR. HARVEY EGINTON.

SIR,—Your inquiry as to the drawings of Stratford-on-Avon Church restoration has just now reached me, as I am the only remaining relative of the late Mr. Harvey Eginton,—I am his sister. All drawings, &c., relative to Stratford and elsewhere became the property of his head clerk (Mr. Field), who shortly after went to Australia, and in about two years' time died suddenly in a street there. I do not know any of his relations or friends, so I fear you will fail to trace the information you require.

EMILY AUDLEY EGINTON.

CHURCH-BUILDING NEWS.

Micheldever.—The parish church of Micheldever, Hants, has been re-opened, after having undergone extensive alterations and restorations at the expense of the lay rector, the Right Hon. the Earl of Northbrook. It is reported that about the year 1806 the church was destroyed by fire, but nothing has been found during the progress of the work to corroborate this; at any rate, a few years afterwards the church was rebuilt by Sir Francis Baring, this being completed in the year 1810. It then remained without alteration (with the exception of a new east window to the memory of the late Lord Northbrook) up to the commencement of the present restoration. Up to this time the church consisted of a western tower (sixteenth century) massive and embattled; a nave in the form of an octagon, with two quasi-transepts (1810) built of red brick and covered with slate, and having heavy plaster arches and mouldings in its inside. The old chancel was covered with cement on the outside, and encumbered with very heavy plaster mouldings and arches inside. The seating was of oak, narrow and uncomfortable, and placed on a stone floor. The improvements consist of the entire restoration of the chancel; the insertion of a panelled and moulded wooden ceiling, richly coloured and gilt; a new chancel arch, with marble columns: a glass mosaic pavement; oak stalls, altar-table and prayer-desk; brass altar-railing and standards, marble credence; carved stone pulpit and new oak seating. A fine old stone arch of Early Perpendicular work has been brought to light and restored. The west window has been filled with stained glass, the gift of Mr. W. Gale, of Micheldever. The total cost, exclusive of its lectern and west window, is about 2,600*l.* which has been borne by the Earl of Northbrook. The work has been carried out under the superintendence of Messrs. John Colson & Son, architects, Winchester. The chancel contains many beautiful monuments to various members of the Baring family, by Flaxman, to which Lord Northbrook has added a marble monument by J. E. Boehm, A.R.A., to the memory of the late Mr. Thos. Baring, of Norman Court. During the progress of the work several fragments of earlier work were brought to light, viz., the remains of two marble fonts of Norman workmanship, pieces of Early English, Decorated, and Perpendicular work, being the remains of a large vaulted ceiling, and a stone screen or reredos of large dimensions. The latter had been decorated with colour and gold, showing that there existed at some time a church of more than ordinary pretensions on the spot.

Taunton.—The new Church of St. Andrew, Taunton, has been consecrated by the Bishop of Bath and Wells. It is erected at Rowbarton to supply the wants of a rapidly-increasing district, near the Great Western Railway Station. It is built of Westleigh stone, with Doulting stone dressings, the walls being lined internally with ornamental brickwork. It consists of a nave, 73 ft. by 18 ft.; north and south aisles, 73 ft. by 9 ft.; chancel, 27 ft. by 18 ft.; north transept, 16 ft. by 9 ft.; entrance porch; and vestry. The tower forms the south transept, and is surmounted with a wooden spire covered with Westmorland slate, and is 100 ft. high to the weathercock. The nave arcade is carried on octagon brick piers, the arches being also of brick in colours. The roofs are open-timbered, covered with plain tiles and plastered between the rafters, except the chancel roof, which is boarded and decorated. The benches are open and of pitch pine, with moulded and framed ends. The passages and chancel are laid with Minton's tiles. The pulpit and font are of Beer stone. The east and south windows of the chancel, also the ten quatrefoil windows of the clearstory are filled with stained glass by Hardman. The church will seat about 500 persons, and the cost has been about 3,000*l.* It has been erected from the designs of Mr. J. Houghton Spencer, of Taunton; the builder being Mr. H. J. Spiller, also of Taunton.

Brynamman.—The Bishop of St. David's has consecrated the new church which has been erected at Brynamman for the accommodation of the 200 persons who, some two or more years back, severed themselves from the Welsh Congregationalists' communion in order to join the church of their forefathers. The building will accommodate 300 persons. It consists of nave, 55 ft. long by 25 ft. wide; and chancel, 26 ft. long by 16 ft. wide. The latter has a small aisle on the south side, and the former a baptistery against the west wall next to a double porch, while on the north side of the chancel a commodious vestry with fuel chamber beneath is provided. The walls are substantially built in courses with dark grey local stone, relieved by windows and dressings of Westwood stone, and the roofs are covered with light grey slates from the Whitland Abbey quarry. The interior, which is well lighted by twelve tracery-headed windows and ten lancets, has lofty side walls and high-pitched roofs, giving a total height of 36 ft. in the nave. The chancel has a boarded ceiling. The pulpit, lectern, stalls, and seats generally are all of pitch pine, the latter fixed upon raised wooden platforms, while the pavements consist of a mixture of stone flagging and Webb's (Worcester) encaustic tiles in patterns. The altar standards were made by Mr. T. Brawn, of Birmingham, in wrought iron and brass work, and the stone carving has been well executed by Mr. Clark, of Hereford. Ample means both for warming and ventilating have been provided, one of Porritt's underground stoves, with flue running the whole length of the nave, being introduced for the former purpose. The whole outlay has not exceeded the original estimate of 1,500*l.* The contractors were Messrs. Balcombe & Price, of Pembroke Dock. Mr. Hay, of Brynamman, acted as clerk of works, under the general direction of the architect, Mr. E. H. Lingen Barker, of Hereford.

St. Breock (Cornwall).—After undergoing restoration, the parish church of St. Breock, near Wadebridge, has been re-opened. The church, which consists of a nave, chancel, south aisle, two little transepts, and a tower, was erected in the sixteenth century. Some time since, owing to the dilapidated state of the church, consequent on the dampness of the situation, it was found necessary to have the building restored. It was resolved, after a while, to have the church renovated, and Mr. J. Piers St. Aubyn was appointed the architect, and the contract was let to Mr. Searle, of St. Austell. The walls, although they have not been rebuilt, have had to be thoroughly renewed,—pointed outside and plastered inside. The church has been thoroughly drained and reseated, open benches of pitch-pine taking the place of the old square pews, and the floor-spaces in the chancel have been covered with tiles, supplied by Mr. Godwin, of Lugwardine, Hereford. The stonework of the arcade has been cleaned, and a stone archway has been made to the two transepts. The roof has been thoroughly repaired, the old wagon-headed shape being retained, with carved bosses by Mr. Webber, of Bodmin. The windows have been reglazed by Messrs. Fouracre & Watson, of Stonehouse. The cost of the restoration is estimated to be 1,400*l.*, and the work has been carried out under the superintendence of Mr. Collins, of Wadebridge, the clerk of the works.

Liverpool.—The foundation-stone of the new church of St. Stephen the Martyr, Liverpool, has been laid by the bishop of the diocese. The church, which originally stood in Crown-street, was taken down owing to the opening up of the tunnel from Lime-street to Edge-hill, and is now being rebuilt, stone for stone as before, on a new and eligible site at the angle formed by the juncture of Crown-street and Grove-street. Great pains have been taken to find the original foundation-stone, of which no information could be obtained, and it was not until the whole church had been taken down that the stone was discovered. On this account the building has been considerably advanced without any attempt at a stone-laying. The long-sought stone having been found, it was decided by the incumbent, the Rev. E. P. Hodgins, D.D., to have it re-laid. The church has been taken down owing to the opening up of the tunnel by the London and North-Western Railway Company, and is being rebuilt on the lines of the original church, as designed by the late Sir Gilbert Scott, under the direction of Messrs. Thomas D. Barry & Son, architects, Liverpool. Mr. John Miller, of Liverpool, is the builder, Mr. Peter Thomas being the clerk of the works.

SCHOOL BUILDING NEWS.

York.—The memorial stone of a new wing to the Industrial Boys' Schools, Mary-gate, York, was laid on the 6th inst. by the Dean of York. The wing will cost 800*l.* The architect is Mr. De Maine, the contractor being Mr. Dennison.

Glossop.—A new school in connexion with Littlemoor Chapel, Glossop, has been opened. The structure now completed is a portion only of a larger scheme, which includes a range of class-room two stories in height, to be built hereafter in the rear of, and connected with, the present school-room. When that extension is added, the partitions now enclosing the two stories of six class-rooms at the east end of the school-room or assembly-hall will be removed. The height of the hall is 34 ft.; viz., 24 ft. to the wall-plate, and 9 ft. in the roof with sloping sides. The floor area of the hall, including the eastern class-rooms, will accommodate 550 adults seated at a lecture or concert. The gallery, which extends along each side, and at the western end of the hall, and is two seats in depth, will accommodate 200 adults, also seated. The three western class-rooms have fixed seats on raised platforms, which are practically a continuation of the gallery. These will accommodate 150 adults. The total capacity of the hall is thus for 900 adults comfortably seated, besides the occupants of a speaker's platform or orchestra. The principal elevation, or front of the building, is towards Victoria-street, which is on the high road from Glossop to Hayfield. This street rises considerably, and the site also rises still more rapidly from front to rear. At the south-west angle of the front a turret, nearly 12 ft. square, is placed, which rises to a height of 75 ft. from the ground to the top of the vane. Turning to the left, after

passing through the porch, a spacious lecture-room is entered. This apartment is 36 ft. long, 20 ft. wide, and 15 ft. high, and is well lighted by front and end windows. In the north-west corner is a lift from the basement chamber, where the tea-boiler is fixed; and immediately opposite are steps up to a service doorway which opens into the assembly-hall. (The floor of the hall is 5 ft. above the lecture-room floor.) There is also a gallery for 100 infants, which is so constructed as to be readily taken apart and put together again. The steps are also movable, and these and the infants' gallery can be stowed away in a chamber provided for the purpose underneath the assembly-hall floor. Native rubble stone has been used for the walls throughout; those towards Victoria-street and the chapel burial-ground (north) being faced with pitch-faced wall-stones from local quarries. All the block stone for the dressings is also from local quarries, and some red stone from Runcorn has been introduced. The roofs are covered with slate, and all the internal woodwork is of pitch-pine, varnished. For warming the building throughout Gibbs's system of hot-water pipes has been adopted. The style is Italian Gothic. A contract was entered into with Mr. Aaron Haughton, of Godley, for the whole of the work, at 2,570*l.*, his manager and foreman on the building being Mr. F. Wilson. The architects of the building were Messrs. Paull & Bonella. The total cost, inclusive of movable fittings or furniture, and play-ground and fences, architects' commission, and payment to clerk of works, is about 2,880*l.*

Rhyl.—Christ Church British Schools, Rhyl, have been completed and opened. They occupy a site at the corner of Crescent-road and Vaughan-street, including altogether some 1,200 yards of land, and are arranged as follows:—The ground-floor is prepared for the use of girls and infants, with entrance from Vaughan-street; the upper floor for boys, or mixed school, as may be determined upon, there being a total accommodation for at least 800 children, should the whole premises be used for teaching purposes. The infants' school is 32 ft. by 25 ft., with a large bay window in one side, and an open-timbered roof. A special room for babies is provided, 18 ft. by 15 ft. The girls' schoolroom is 90 ft. long and 22 ft. wide, and has large windows all down one side, kept well up from the floor, and going close up to the ceiling. A class-room, 27 ft. by 22 ft., is entered from the side of this room, and two others from the end, respectively 24 ft. by 22 ft. and 22 ft. by 16 ft.; stairs for communication with the mixed schoolroom over, and closets for books, &c., being provided between these class-rooms. The boys (or mixed) schoolrooms, &c., are on the first-floor, with entrance from the play-ground at the back, and private communication as before with the girls' rooms below. The large schoolroom is 60 ft. by 22 ft., with lofty open-timber roof, windows all down one side and one end, the other end having two large class-rooms, respectively 24 ft. by 22 ft. and 22 ft. by 16 ft., separated from the large room by sliding screens of pitch pine and glass, so as to be thrown into the large schoolroom or used separately as may be desired. Three other class-rooms are also provided, of somewhat similar dimensions to those named, with book-rooms, &c. The exterior is in brick and terra-cotta work. The architect is Mr. C. O. Ellison, of Liverpool. Messrs. Collin & Son, Warrington, were the general contractors, and Mr. Hammond has been clerk of works.

The Royal Polytechnic Institution finally closed its doors as a place of scientific amusement, if we may so term it, on Saturday last, having had a career of more than forty years. It had for some time ceased to be a remunerative concern to the shareholders. When it had been in existence ten or twelve years a rival to it, known as the "Royal Panopticon," Leicester-square, was projected and started, but the career of this latter venture was very short, the building (specially erected for it from designs by Mr. T. Hayter Lewis) having been for the last twenty years and more known as the "Alhambra." The Polytechnic was established before the days of Crystal Palaces and Great Exhibitions, and has fulfilled a useful function. Now its career is closed its promoters may congratulate themselves in remembering that many of its best features have been imitated by other institutions. There is no denying that it had become very dull and very dusty.

Miscellanea.

Burning of the Park Theatre, Camden Town.—The Park Theatre at Camden-town was totally destroyed by fire early on Sunday morning last. The theatre, which was originally known as "The Alexandra," and was erected some nine or ten years ago from designs by the late Mr. H. C. Robinson, who held the appointment of Architect to the Department of the Lord Chamberlain, was situated at the eastern end of Park street, Camden-town. The performances on Saturday night terminated about a quarter past eleven o'clock, when it was supposed that the gas had been properly turned off, that the theatre was closed, and that all the *employés* had left the premises. A few minutes before twelve a police constable observed smoke issued from the stage end of the building. He at once raised an alarm, and, in company with another constable, rushed into the stage entrance. To their astonishment they found a number of the actors and actresses, who had been engaged in the performance, packing up their dresses and properties in the lower part of the building. They had observed a smell of smoke, but were not aware that the place was on fire. The fire seems to have originated in the upper portion of the stage, probably in or near one of the dressing-rooms. Scarcely had the discovery of the smoke been made when flames burst out. The firemen directed their efforts to confining the fire within the building, and, in consequence of good outer walls and of the body of water thrown on the fire, by about one o'clock it was felt that this object had been attained, but it was not until between four and five o'clock on Sunday morning that it was finally got under, by which time the entire theatre was gutted. The old story; and yet in this case the existence of the fire appears to have been discovered even before the appearance of flames.

Manchester Royal Institution.—The negotiations for the transfer of this institution of the fine arts to the Manchester Corporation have been concluded on the eve of the opening of the annual autumn exhibition of pictures. The proposal of the governors or proprietors of the institution, about 350 in number, was to hand over their land and building in Mosley-street, with its pictures and statuary, to the municipal body, free of all cost but the payment of chief rent (about 100*l.* a year), and a guaranteed endowment from the city rates of 2,000*l.* a year for the purchase of pictures to enrich the permanent collection. This offer was agreed to by a committee of the corporation on the understanding that the endowment should be limited to the next twenty years, anything contributed after that to depend upon the public opinion of the time. The proprietors will hold one-third of the seats on the future committee of management, and their individual privileges of admission to exhibitions or lectures will be preserved. The art-gallery will be open free to the public on such days of the week as the committee shall determine. All proceedings of the governing body are to be submitted to the civic council for confirmation, as provided by the Municipal Acts. The building thus acquired by the public was erected from the designs of the late Sir C. Barry.

The New Town Hall at Staines has been opened. It has been erected from the designs of Mr. J. Johnson, architect, London, whose plans were chosen out of forty-five sets submitted in competition. The contract price for the hall was 4,797*l.* The building contains two assembly-rooms, one capable of containing 500 seats, and another about 250, whilst there are offices for clerk, surveyor, &c. At the top of the building are five rooms for the hall-keeper, and two kitchens in the rear. There are also ante-rooms, cellarage, lavatories, &c. At the rear of the building will be an ornamental garden with river-wall and promenade, an access from the Themes by a set of steps being also contemplated.

Mr. D'Oyly Carte's New "Savoy" Theatre will be opened at the end of the month, with "Patience," for which new scenery has been painted. The whole of the interior fittings, plastic work, upholstery, &c., have been designed and carried out by Messrs. Collinson & Lock.

Oxford High School for Boys—The new High School for boys, erected in George-street, from the plans of Mr. T. G. Jackson, M.A., architect, the foundation-stone of which was laid by Prince Leopold some time since, was opened by the Earl of Jersey on Thursday, the 15th inst.

Sanitary Dwellings.—A meeting was held on Saturday, under the auspices of the Local Rights Association, in the hall of the club, Rose-street, Soho, to consider the question of unsanitary dwellings, and hear a statement of the objects of the association. Mr. Alfred Boynes presided. Mr. Edwin Dunn explained that the association had its origin in an attempt by a few working men to do something to prevent their fellow-beings growing up in the wretched condition in which they were constantly found in the quarters inhabited by the working classes. They found the Artisans and Labourers' Dwellings Acts almost a dead letter or worse, because their working caused increased miseries to the parties they were meant to benefit. They had set about exposing some of the worst cases, and pointing out what they considered a remedy, viz., that the authorities should themselves build houses for the people, and let them to the labouring classes only at the lowest rental consistent with a fair return for money expended. Exorbitant rents were the curse of the working classes, and it drove working people into the lowest slums. The association also sought the abolition of distraint for rent, with a substitution of the County Court process. Those objects, he believed, entitled them to support. Mr. Beattie, Mr. Traumere, and Mr. Lords, also addressed the meeting, and a resolution expressing approval of its objects was unanimously carried.

Dr. George C. M. Birdwood, C.S.I., of the Indian Museum, upon whom it is stated her Majesty has been graciously pleased to confer the honour of knighthood, is the second son of General Christopher Birdwood, of the Bombay Army, and was born in 1832. After serving for many years on the Bombay Medical Staff, he was appointed special assistant in the Revenue, Statistics, and Commercial Department of the India Office, where he has had special charge of the Indian Museum, and has rendered valuable assistance in examining and reporting upon the stores of Indian curiosities and works of art contained therein. He has also written a handbook on Indian industries, and has commented largely upon Indian literature and philology.

Proposed International Exhibition at Manchester in 1882—A proposition for the holding of an international exhibition at Manchester in 1882 has been mooted. It is suggested that the interval of twenty years since the last great exhibition of arts and industry in London is long enough for such changes and progress to have been made as must justify an exposition of them in England, and that Manchester might fairly be the place for it, as being the centre of a more populous district than any other,—a district with greater variety of productions and manufactures than any other, and easy of access by way of Liverpool to the most distant parts of the world.

Statistics of Wesleyan Chapel Building. The minutes of the 138th annual conference of the British Wesleyan Church, recently held in Liverpool, have been issued. From them we learn that erections have been sanctioned as under:—94 churches, at an estimated cost of 161,963*l.*; 9 manses, at 7,695*l.*; 10 school-rooms, at 4,531*l.*; 83 alterations and enlargements, at 41,565*l.*; 99 modifications, at 35,975*l.*; 26 organs, at 7,549*l.* The following erections have been completed during the year:—141 churches, costing 229,912*l.*; 13 manses, 13,205*l.*; 26 school-rooms, 12,324*l.*; 89 alterations and enlargements, 55,687*l.*; 14 organs, 5,326*l.*

Kendal.—It is proposed to repeat and decorate the Unitarian Chapel, Kendal. The ceiling will be panelled and ornamented in plaster, the seats will be of pitch-pine. There is also to be a new organ. The cost of the works, including organ, will be about 1,000*l.* Mr. Eli Cox is the architect.

Liquid Chinese Ink.—We have received a bottle of Wolff & Son's Liquid Chinese Ink. It appears to work well, and does not wash up when once dry. Whether it would retain this quality when stale would have to be seen. For pen-and-ink drawing the liquid ink is obviously convenient.

Rendle's Glazing—By some unaccountable accident in the composing-room, the Citadel Station at Carlisle, represented in Messrs. Rendle & Co.'s advertisement last week, and which is glazed on Rendle's Patent System, is described as at Glasgow. It is rightly allocated in the paragraph we gave in the same number announcing the lamented death of the patentee, but we think it right to point out the slip. The work is an important one.

Unsafe Letter-Boxes.—The *Northampton Herald* records a bank robbery by children at Wellingborough. It seems that on a recent Sunday morning, two little boys named Walter Weaver and Frank Blunt, both under seven years of age, were playing against the Union Bank, in Market-street. One of them put his arm down the Bank letter-box, and reached out a letter containing 1,400*l.* in cheques, which had been paid in at Northampton on Saturday, and were of no value to anybody except the Banking Company. The young urchins then proceeded to give away the cheques, putting some under shop-doors, and otherwise distributing them. Sometime on the Monday the matter came to the ears of the police, and the delinquents were questioned, and inquiries made about the missing cheques, and most of them were speedily recovered. The building has been erected about a year. Unless we are mistaken, Messrs. Hart, Son, Peard, & Co., a few years since introduced a patent letter-box ("Shove's patent," we think it was called) intended to prevent the abstraction of letters. The incident mentioned by the Northampton paper shows the importance of attending to what is apparently a small detail in a building. Where it is necessary to make the slit or entrance to the letter-box large and wide, for the admission of newspapers and book-packets, the box should be made sufficiently large and deep as to place its contents beyond the reach of pilfering fingers.

"Dover Priory Gateway."—With reference to the paragraph in our last, thus headed, we have received a letter from a solicitor, on the part of the gentleman who has, it is said, hitherto acted as architect for the college, stating that it "reflects upon him in his profession," and demanding an apology for its insertion. Having committed no fault we can scarcely apologise, but we shall be very sorry indeed if the paragraph be misunderstood. There was no intention to "reflect," in the slightest degree, upon any one. The sole intention of the paragraph, hastily written at the last moment, was to decline entering into a discussion, concerning the merits of which we know literally nothing. Expediency, mere personal preference, in fact any one of half a dozen reasons, none of them reflecting on the professional character of the local architect, might be quoted by the Council as sufficient to justify them in changing, and it was to such as these we referred. At the same time, for anything we know, the Council may be utterly in the wrong.

What might have been expected.—The *Times* of the 9th inst. describes an accident which occurred on the previous day at Yarmouth to a youth named Sidney Plucknett, in the employment of Mr. Salter, contractor. The head of the smith department was cleaning an ordinary iron oil-drum, and placed it, containing some water tightly corked down with a wooden plug, on the forge fire, with instructions to Plucknett to make it boil. The generated steam having no escape, a terrific explosion resulted, which wrecked the shop and threw the boiling water over the youth's chest and face, inflicting severe injuries, from which he died in three hours.

Bunhill-row.—Great changes are taking place in this locality. Nearly all the dwellings on the right hand side as far as the church of St. Paul are being demolished, the leases having fallen in. The ground has been let upon a building lease to Mr. Walker, of Bunhill-row, by the Hon. Artillery Company.

At the Royal Manchester and Liverpool Agricultural Society's Show, held at Blackburn on the 1st, 2nd, and 3rd of September, Messrs. W. H. Bailey & Co., of the Albion Works, Salford, exhibited their slow-combustion hot-air engine, and obtained the first-class silver medal for its excellence.

Glasgow Institute of Fine Arts.—The galleries of this Institute in Sauchiehall-street are now open with an exhibition of works in Black and White (1,127 in number), in addition to the works exhibited by the Scottish Society of Painters in Water-Colours. Both departments of the exhibition are well worth visiting.

Cost of the National Museum, Amsterdam.—The amount of the various contracts given in our account of this building (p. 295, *ante*), was in guilders (1*s.* 8*d.*), not francs, as we were informed and stated.

An Exhibition of Irish Industries is proposed to be held in Dublin next year. The promoters feel assured of success, and the guarantee fund is assuming large dimensions.

Scarborough.—New "Barracks" (by which they mean a chapel or meeting-house) are being erected here for the body known as the "Salvation Army," and the foundation-stones were laid on the 30th of August. The "barracks" will occupy a site at the junction of Alma-parade and Victoria-road, and are intended to accommodate 2,000 "soldiers," in other words, a congregation of 2,000 persons, men, women, and children.

Margate.—The Roman Catholic Church of St. Vincent, in the Victoria-road, Margate, was recently reopened. From the designs of Messrs. Pugin a new pitch-pine roof has been added to the church by Messrs. Brown & Son, and the sanctuary,—indeed, the whole church,—has been re-decorated, the cost being 300*l.*

The Arts' Association Exhibition, Newcastle.—Of the 774 pictures and drawings exhibited this year, nearly 200 are by local artists. Taking into account that no one can send more than three works, this represents a large number of exhibitors.

Trade Unions Congress.—The Congress of Delegates was opened on Monday last in St. Andrew's Hall, Newman-street, Oxford-street. Many topics have been dealt with, and shall have our attention next week.

Wandsworth Public Hall.—The right title of the firm who supplied and fixed the heating apparatus here is "The Thames Bank Iron Company."

TENDERS

For the erection of shops and premises, North Cross-street, Gosport, for Mr. Bishop. Mr. Jas. W. Stroud, architect. Quantities by Mr. C. M. Houghton:—

F. Harding	£1,671 0 0
T. B. Hayter	1,650 0 0
J. Butt	1,620 0 0
C. M. Daab	1,514 0 0
G. J. Cole	1,499 0 0
W. Rapley	1,435 0 0
R. Taylor (accepted)	1,238 0 0

For new counter, &c., at the Prince's Head, York-road, Battersea, for Mr. Ewington. Mr. H. J. Newton, architect:—

Davidson	£287 19 6
Warne	283 10 0
Kemble	278 15 0
Hellings	266 0 0
Heath	253 0 0
Matthews (accepted)	205 6 0
New Cabinet and Bar Fittings.	
Beale	£463 10 0
Lascelles	579 0 0
Taylor	498 0 0
Gill	487 0 0
Simpson (accepted)	430 0 0

For Industrial Dwellings, Alsop's-place, Old Gravel-lane. Mr. E. Hoole, architect:—

Jackson & Todd	£824 0 0
Holloway	795 0 0
Kirby	783 0 0
W. Smith	781 0 0
Lathey, Bros. (accepted)	707 0 0

For additions and alterations to St. Andrew's House, Regent's Park. Mr. Arthur Vernon, architect. Quantities by Mr. Walter L. Vernon:—

Bird	£5,496 0 0
Wagstaff & Son	5,121 0 0
Holland & Hannen (accepted)	4,976 0 0
Perkins	4,690 0 0

For pulling down and re-building Nos. 37 and 38, Margaret-street. Mr. A. E. Hughes, architect. Quantities by Messrs. Sandell & Corderay:—

		Time.
Downs	£8,310	9 months.
Higgs	6,294	9 ,,
Williams & Sons	6,174	9 ,,
Hewitt	6,173	—
Higgs & Hill	6,150	—
Simpson	6,000	12 ,,
McLachlan & Sons	5,680	9 ,,
Manley	5,677	12 ,,

For alterations and additions to "Redland Bank," Bristol, for Mr. Alfred Ball. Mr. Herbert J. Jones, architect:—

Contract No. 1.	
Lewis & Sons	£937 0 0
E. & T. Hatherley	893 0 0
Humphreys	870 0 0
Church	640 0 0
Supplementary Contracts.	
Church	348 10 0
Decorations.	
Edkins & Sons	250 0 0

For a pair of semi-detached residences, Randall-road, Clifton, for Mr. J. S. Strong. Mr. Herbert J. Jones, architect:—

Hannam & Wilkinson	£1,080 0 0

For erecting a new tun-room for Messrs. Mackison & Co., at their Brewery, Hythe, Kent. Messrs. Seamell & Culyer, architects. Quantities by Messrs. Curtis & Sons:

Contract No. 1.	
W. Tongue, Plumstead	£1,729 0 0
Morter, Stratford	1,710 0 0
Kirk & Randle, Woolwich	1,695 0 0
J. Brown, London	1,682 0 0
W. J. Adcock, Dover	1,498 0 0

For Carlisle Grammar School. Messrs. Hetherington & Oliver, architects:—

Excavator, Mason, and Bricklayer's Work.	
John Hutton	£5,961 0 0
Jos. Irving	5,863 1 0
J. & R. Laing	5,700 0 0
C. & J. Armstrong	4,800 0 0
Jas. Metcalfe	4,800 0 0
Beaty, Bros. (accepted)	4,591 13 4
Carpenter and Joiner's Work.	
Batey & Forster	£3,448 0 0
G. Black	3,303 0 0
W. & H. Davidson	3,200 11 0
Wm. Court	2,998 0 0
Jas. Wright	2,875 0 0
Court, Bros. (accepted)	2,748 12 3
John Reed	2,694 17 0

For rebuilding portions of Yoroshi House, Woolwich, for the trustees of Captain Skinner, R.A. Mr. Walter Graves, architect:—

Ward & Lamble (accepted)	£333 0 0

For pair of semi-detached dwellings, exclusive of foundation work, Finchley-road, N.W., for Mr. David Tildesley. Mr. Walter Graves, architect. Quantities by Mr. Barnett:—

C. Kelloud (accepted)	£2,900 0 0

For alterations and new pitch pine seats for the Committee of the Welsh Baptist Chapel, at the Frankland Hall, Castle-street, Oxford-street. Mr. Owen Lewis architect:—

W. J. Beales	£297 0 0
Galatey	294 0 0
Lawrence	288 12 0
Bowden	233 10 0
Blandford & Co.	220 0 0
Lewis	209 10 0
Norris	179 10 0

For the erection of a residence, &c., Ascot, Berkshire, for Mr. G. Cawston. Mr. Arthur Cawston, architect:—

J. & C. Bowyer	£4,241 0 0
Patrick & Son	4,156 0 0
Rider & Son (accepted conditionally)	3,998 0 0
Colls & Co.* (withdrawn)	3,499 0 0

* Offered again at £3,899, but refused.

For building public-house, Trafalgar-road, Gorleston, Great Yarmouth, for Messrs. Steward, Patterson, Finch, & Co. Mr. J. Wm. Cockrill, architect:—

Springall, Great Yarmouth	£713 0 0
T. Howes, Great Yarmouth	709 0 0
Norfor, Southtown	674 0 0
Bray, Great Yarmouth	647 0 0
Want, Great Yarmouth	630 0 0
Rans & Cooper, Great Yarmouth	630 0 0
Poxon, Great Yarmouth	626 0 0
Fuller, Gorleston	626 0 0
Beech & Cork, Great Yarmouth	624 0 0

For building three cottages, at Belton, Great Yarmouth, for Mr. Jas. Guyton. Mr. Jas Wm Cockrill, architect:—

Newman, Southtown	£394 10 0
Burgess, Burgh Castle	390 0 0
Bray, Yarmouth	366 0 0
Fuller, Gorleston	330 0 0
Poxon, Yarmouth	325 0 0

For new road and sewers on the Fulham No. 2 Estate, for Mr. G. B. Holland:—

Dunmore	£445 0 0
Jackson	444 0 0
Pizzey	424 0 0
Wilson	413 0 0
Keeble	359 0 0
Harris (accepted)	320 0 0

For additions and reparations to school buildings and master's house, Shalford, Surrey, for the Shalford School Board. Messrs. Peak, Lunn, & Peak, architects. Quantities supplied:—

	School.	Master's House.
G. Strudwick, Guildford	£924 10 0	£36 10 0
Martin, Wells, & Co., Aldershot	904 10 0	62 0 0
R. Pink, Milford	887 17 0	44 15 0
Whitburn, Shalford	879 13 3	39 9 6
S. Fowler, Woking	807 0 0	29 0 0
R. Peat, Redhill	754 10 0	32 0 0
W. Smith & Sons, Guildford	716 14 0	29 5 0
Mitchell, Bros.,* Shalford	650 0 0	22 10 0
Unsigned Tender	530 0 0	40 0 0

* Accepted subject to approval of Education Department.

For re-making, draining, and widening, &c., the Jenner-road, Guildford. Mr. H. Peak, surveyor:—

Martin, Wells, & Co.,* Aldershot	£502 3 0

* Accepted.

For the erection of a gatekeeper's lodge, at Enton, Witley, Surrey, for Mr. F. H. Eastwood, J.P. Messrs. Peak, Lunn, & Peak, architects. Quantities supplied:—

Martin Wells & Co.,* Aldershot and London	£325 7 8

* Accepted.

For proposed tavern and restaurant, Temple-street, Whitefriars, for Mr. John Finley. Mr. F. Adams Smith, architect. Quantities by Mr. S. B. Wilson:—

		If Box-ground stone, allow
Higgs & Hill	£6,200	£136
G. S. S. Williams & Son	6,100	250
Wm. Brass	5,870	195
Hall, Beddall, & Co.	5,847	197
Mark Patrick & Son	5,673	200
Ashby, Bros.	5,621	195
Richard Conder	5,329	233
Thos. Rider & Son (too late)	5,821	199

For forming roads and paths, and laying in drains, on the Southend-on-Sea Estate, for the National Liberal Land Company (Limited). Mr. George Pooley, surveyor:—

W. Steward	£835 14 9
Wm. Spendelow	615 14 6
Jas. Bloomfield (accepted)	511 0 0

For storage reservoir, Tunbridge Wells:—

General Works.

W. Webster, London	£28,074	13	4!
W. J. Botterill, London	26,231	0	0
T. B. Hayter, Portsmouth	24,177	9	10
Ball & Gammon, Gillingham	23,874	12	10
Paramor & Sons, Margate	23,774	3	6
W. Hill & Co., Gosport	21,329	3	0
G. Punnett & Sons, Tonbridge	20,539	18	9
G. Smith & Co., Southport	19,877	17	11
J. Dickson, Sevenoaks	19,661	4	11
Chamberlain, Littlehampton	19,354	10	1
C. Dickenson, London	19,049	4	11
F. Nowell, London	18,293	11	6
G. Stevenson, Eckington	17,553	5	9
E. J. Strange & Sons, Tunbridge Wells	17,277	2	10
Fawkes, Bros., Southport	17,031	0	1½
H. Potter (accepted), London	16,925	14	5!

Asphalte Lining.

Claridge's Patent Asphalte Co., London	£10,704	17	8
L. Stiebel, London	8,865	8	0
F. Nowell, London	8,302	15	0
The Limmer Co., London	7,921	17	0
Val de Travers Co., London	7,428	15	9
H. Lockwood, Manchester	6,564	1	9
S. Davis, Manchester	6,120	8	6
Société Française, London	5,920	18	0
H. Melsom, Birmingham	5,417	2	0
Green & Co., Portsmouth	5,376	12	6
Fawkes, Bros., Southport	5,347	14	9
L. M. Lowe, Farnworth	5,208	2	6
Bradshaw & Co. (accepted), London	5,018	9	7
J. Harrison & Co., London	4,207	2	6

For Local Board Offices, residence, and stables, Sevenoaks, Kent. Mr. G. W. Brumell, architect. Quantities by Mr. T. Potter:—

Tomsett, Tunbridge Wells	£2,143	19	5
John Boase, Greatness, Sevenoaks	2,025	8	0
W. J. Botterill, London	1,865	0	0
Bottoms, Bros., Battersea	1,861	0	0
Ennor Julian & Co., London	1,730	0	0
J. Adcock, Dover	1,698	19	6
H. Owen, Sevenoaks	1,694	0	0
Jones & Co., Gloucester	1,684	0	0
T. Higgs, Loughborough Junction	1,677	0	0
R. Durtnall, Brasted	1,665	0	0
J. Bingham, Headcorn	1,658	0	0
W. Wright, Chelsfield	1,650	0	0
W. Wiltshire, Sevenoaks	1,650	0	0
W. J. Beale, Battersea	1,614	10	0
Willicombe & Oakley, Tunbridge Wells	1,600	0	0
C. King, Sevenoaks	1,539	0	0
F. Warr, Croydon	1,424	0	0

For the erection of a new school for 160 children, at Wenhaston, near Halesworth; boundary-wall, &c. Messrs. N. Peels & Son, architects. Quantities supplied:—

Morris, Ditchingham	£1,487	0	0
Holsworth & Son, Bungay	1,450	0	0
Hindes, Beccles	1,438	0	0
A. Coe, Ipswich	1,429	0	0
Smyth & Son, Aldeborough	1,398	0	0
Marsden, Bramfield	1,367	7	0
Allen, Southwold	1,340	0	0
Ludkin & Son, Banham	1,325	0	0
Watson, Bungay	1,323	0	0
Calver, Ringsfield	1,289	0	0
Carter & Son, Saxmundham	1,271	12	8
Dunn, Beccles	1,265	0	0
Gibbs & Son, Yoxford	1,245	0	0
Gladwell (accepted), Ipswich	1,199	10	0

For the decoration of St. Margaret's Church, Tyler's-green, Penn, Bucks, for Sir Philip Rose, bart. Mr. Henry G. Liley, architect:—

Liley & Wood (accepted).

For alterations, additions, and decoration, to 1, Cromwell-road, South Kensington, for Sir Philip Rose, bart. Mr. Henry G. Liley, architect:—

Liley & Wood (accepted).

For warming and ventilating, by their new hydro-caloric apparatus, the new Congregational Schools and Lecture-hall, East-hill, Wandsworth. Mr. E. W. Mountford, architect:—

J. Weekes & Co., Chelsea	£102	0	0

For road-making and laying of sewers, Enfield. Mr. Ernest Howard, surveyor:—

T. Rowley	£2,420	0	0!
W. Harris	2,300	0	0
Beadle & Co.	2,180	0	0
Ford & Everett	2,240	0	0
G. Aldred	2,229	0	0
G. Pound	2,048	0	0
Taylor	1,992	0	0
Taylor & Co. (accepted)	1,855	0	0
Pugh & Co.	1,648	0	0
H. Woodham	1,599	0	0
J. Ball	1,410	0	0!

For the erection of house, &c., at Hatton-garden, for Messrs. Reid & Co. Mr. Ansell, architect:—

Patman & Fotheringham	£2,750	0	0
Laurence	2,477	0	0
Anley	2,320	0	0
Godden	2,310	0	0
Macey & Son	2,253	0	0
Cox	2,248	0	0
Jay	2,150	0	0
Langmead & Way (accepted)	2,150	0	0

For rebuilding 36 and 37, Brewer-street, Soho, for Mr. Rentoul. Mr. W. Cubitt Nichols, architect. Mr. H. P. Foster, surveyor:—

Hunt	£2,147	0	0
Bywater	2,050	0	0
Ansell	1,999	0	0
Conder	1,881	0	0
Langmead & Way	1,812	0	0

For taking off old and constructing new roof, and other alterations, at Wesleyan Chapel, Mansfield-road, Nottingham. Messrs. S. Dutton Walker & Howitt, architects:—

Contract No. 1.

Lynam (accepted)	£1,300	0	0

Contract No. 2.

For new entrances, porch, &c., to the same building:—

Jelley	£464	10	0
Vickers	450	0	0
Clarke	440	0	0
Lynam	434	0	0
Scott	433	0	0
Bell & Son (accepted), Nottingham	415	0	0

TO CORRESPONDENTS.

Constant Reader (we cannot give addresses).—H. G. L. (should have sent list of names and amounts).—J. D. (we cannot speak of schemes of which we know nothing).—C. R. (no; the Hungerford Bridge was erected without any reference to Clifton, and was taken there afterwards).—G. P.—R. & Co.—J. E. L.—P. A.—E. H.—W. C. T.—G. r. S.—H. J. N.—A. V.—W. C.—P. H. J.—J. D.—B. L.—L. & W.—H. & Co.—C. M. H.—W. H. P.—W. P. B.—J. D.—G. W. B.—J. C.—W. F. B.—P. Bros.—C. M.—E. C.—W. H. P.—W. M.—W. G.—F. S.—F. A. S.—H. & O.—O. L.—H. H.—J.—A. K.—C. & son.—H. P.—T. S.—H. B. M.—D. W.—E. C.—H. J. J.—E. C.—J. H. S.—J. S. H.—C. E. (too).—J. B. shall have attention.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

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